EPA/ROD/R08-96/127
1996

EPA Superfund
Record of Decision:

ANACONDA CO. SMELTER
EPA ID: MTD093291656
OU 16
ANACONDA, MT
09/30/1996

RECORD OF DECISION

COMMUNITY SOILS
OPERABLE UNIT
ANACONDA SMELTER NPL SITE
ANACONDA, MONTANA

September 25, 1996

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RECORD OF DECISION

COMMUNITY SOILS
OPERABLE UNIT
ANACONDA SMELTER NATIONAL PRIORITIES LIST SITE

The U.S. Environmental Protection Agency (EPA), with the concurrence of the Montana Department of Environmental Quality (DEQ), presents this Record of Decision (ROD) for the Community Soils Operable Unit (OU) of the Anaconda Smelter National Priorities List (NPL) Site. The Rod is based on the Administrative Record for the Community Soils OU, including the Remedial Investigation/Feasibility (RI/FS), the Proposed Plan, the public comments received, including those from the potentially responsible parties (PRPs), and EPA responses. The ROD presents a brief summary of the RI/FS, actual and potential risks to human health and the environment, and the Selected remedy. EPA followed the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, the National Contingency Plan (NCP), and appropriate guidance in preparation of the ROD. The three purposes of the ROD are to:

1. Certify that the remedy selection process was carried out in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (collectively, CERCLA), and, to the extent practicable, the National Contingency Plan (NCP);

2. Outline the engineering components and remediation requirements of the Selected Remedy; and

3. Provide the public with a consolidated source of information about the history, characteristics, and risk posed by the conditions at the Community Soils OU, as well as a summary of the cleanup alternatives considered, their evaluation, the rationale behind the Selected Remedy, and the agencies' consideration of, and responses to, the comments received.

The ROD is organized into three distinct sections:

1. The Declaration section functions as an abstract for the key information contained in the ROD and is the section of the ROD signed by the EPA Ecosystems Protection and Remediation Division Director and the DEQ Director;

2. The Decision Summary section provides an overview of the OU characteristics, the alternatives evaluated, and the analysis of those options. The Decision Summary also identifies the Selected Remedy and explains how the remedy fulfills statutory requirements; and

3. The Responsiveness Summary section addresses public comments received on the Proposed Plan, the RI/FS, and other information in the Administrative record.

DECLARATION

SITE NAME AND LOCATION

Anaconda Smelter NPL Site
Anaconda, Deer Lodge County, Montana
Community Soils Operable Unit

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Selected Remedy for the Community Soils Operable Unit (OU) of the Anaconda Smelter NPL Site in Deer Lodge County, Montana. EPA, with the concurrence of DEQ, selected the remedy in accordance with CERCLA and the NCP.

This decision is based on the Administrative Record for the Community Soils OU of the Anaconda Smelter NPL Site. The Administrative Record (on microfilm) and copies of key documents are available for public review at the Hearst Free Library, located on the corner of Fourth and Main in Anaconda, Montana, and at the Montana Tech Library in Butte, Montana. The complete Administrative Record may also be reviewed at the EPA Records center in the Federal Building, 301 South Park, in Helena, Montana.

The State of Montana concurs with the Selected Remedy, as indicated by its signature.

ASSESSMENT OF THE SITE

Actual or threatened release of hazardous substances at and from the Community soils OU, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The community Soils OU is the fourth remedial action to be taken at the Anaconda Smelter NPL Site. The first action, taken at the Mill Creek OU, involved the relocation of residents from the community of Mill Creek after other initial stabilization and removal efforts. The second action was the Flue Dust OU, which addressed one of the principal threat wastes (flu dust) remaining on the Anaconda Smelter NPL Site. That action addressed flue dust at the site through removal, treatment, and containment. At approximately the same time, other removal actions were undertaken, including permanent removal and disposal of Arbiter and beryllium wastes and the selective removal of contaminated residential yard materials from the community of Anaconda. The third action addressed various waste sources found within the Old Works/East Anaconda Development Area OU, located adjacent to the community of Anaconda, and in some areas of future development, and followed an initial removal action in the same area. Certain wastes within the OW/EADA OU received an engineered cover, including the Red Sands waste material and the Heap Roast slag piles, while others were consolidated and/or covered, including the Floodplain wastes and miscellaneous waste piles. In addition, the third action allowed economic development (i.e., construction of a golf course in the Old Works area) and provided the final response action at the Mill Creek OU.

This remedial action at the Community Soils OU will address all remaining residential and commercial/industrial soils within the Anaconda Smelter NPL Site. The principal contaminant of concern at the community Soils OU is arsenic in surficial soils from past aerial emissions and railroad beds constructed of waste material. This ROD establishes residential and commercial/industrial action levels at the Anaconda Smelter NPL Site.

All remaining cleanup decisions for the Anaconda Smelter NPL Site will be made under the Anaconda Regional Water, Waste, and Soils (ARWWS) OU. The ARWWS OU is intended to be the last OU at the site and will address potential impacts to surface and groundwater from soils and waste sources such as tailings and slag. This OU will address human and environmental risks associated with site-specific contamination that have not been addressed by other response actions.

Major components of the remedy for residential soils include:

1. Clean up all current residential soils that exceed the residential action level of 250 parts per million (ppm) soil arsenic concentration, through removal and replacement with clean soil and placement of a vegetative or other protective barrier;

2. In areas where specific site conditions dictate that removal is not implementable, treatment or other measures (e.g., capping, tilling, Institutional Controls (ICs) will be taken to reduce arsenic concentrations to below the 250 ppm action level or to prevent exposure;

3. Clean up all future residential soils at the time of development that exceed the residential action level of 250 ppm soil arsenic concentration, through the Anaconda-Deer Lodge County (ADLC) Development Permit System (DPS); and

4. Implement ICs to provide educational information to all residents describing potential risks, and recommendations to reduce exposure to residual contaminants in soils, and to ensure the long-term viability of this remedy.

Major components of the remedy for commercial/industrial include:

1. Clean up all current commercial or industrial areas that exceed the commercial/industrial action level of 500 ppm soil arsenic concentration through a combination of revegetative techniques and/or engineered covers; and

2. Clean up all future commercial or industrial areas at the time of development that exceed the commercial/industrial action level of 500 ppm soil arsenic concentration through the ADLC-DPS.

Major components of the remedy for the railroad beds include:

1. Construct an engineered cover over all contaminated railroad bed material within the community of Anaconda to prevent direct contact with, and reduce potential for erosion and transport of, contaminated materials to residential and commercial/industrial areas;

2. Separate the railbed from residential and commercial/industrial areas with a barrier to restrict access to the railbed and to control surface runoff from the railbed through the use of retaining walls and/or curbing; and

3. Maintain existing ICs to restrict access.

The Selected Remedy will achieve reduction of risk to human health through the following:

- Reduction of surface soil concentrations in residential and commercial/industrial areas to acceptable levels; and/or

- Prevention of direct human contact with waste materials exceeding acceptable levels.

STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective. This remedy utilizes permanent solutions (e.g., soil removal and engineered covers) and alternative treatment technologies to the maximum extent practicable for this site. The remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. Treatment is not a principal element of the remedy because 1) soils are being removed, thus eliminating the need for treatment and 2) treatment of railroad bed materials was not found to be practicable on an active rail line. However, treatment of other principal threats has been employed in other responses at this site.

Since hazardous substances above health-based levels will remain on-site, (i.e., railroad beds and on-site soil management areas) a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

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DECISION SUMMARY

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LIST OF ACRONYMS, ABBREVIATIONS, AND INITIALISMS

ADLC	Anaconda-Deer Lodge County
AM-95	Upper 95% Confidence Limit of the Arithmetic Mean
AMC	Anaconda Mining Company
AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
ARCO	Atlantic Richfield Company
ARWWS	Anaconda Regional Water, Waste, and Soils
CDI	Chronic Daily Intake
CDM Federal	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of Federal Regulations
C.F.R.	Code of Federal Regulations
COPC	Chemical of Potential Concern
CPMP	Community Protective Measures Program
CTE	Central Tendency Exposure
DEQ	State of Montana Department of Environmental Quality
DPS	Development Permit System
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
ICs	Institutional Controls
IEUBK	Integrated Exposure Uptake/Biokinetic
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OW/EADA	Old Works/East Anaconda Development Area
OU	Operable Unit
pH	hydrogen ion concentration
PM-10	10 micron particle size
ppm	parts per million
PRP	Potentially Responsible Party
RARUS	RARUS Railway Company
RfD	Reference Dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SCEM	Site Conceptual Exposure Model
SF	Slope Factor
SMP	Site Management Plan
SPM	Settled Particulate Matter
TCRA	Time-Critical Response Action
:g/dL	micrograms per deciliter
:g/L	micrograms per liter
UCL	Upper Confidence Limit
U.S.C.	United States Code

1.0 SITE NAME, LOCATION, AND DESCRIPTION

Anaconda Smelter NPL Site
Community Soils Operable Unit
Anaconda, Montana

The Anaconda Smelter National Priorities List (NPL) Site is located in the Deer Lodge Valley in southwestern Montana, in and around the city of Anaconda and about 25 miles northwest of the city of Butte (Figure 1). Milling and Smelting activities conducted at the Old Works and Washoe Reduction Works smelters for nearly 100 years have resulted in the contamination of various environmental media in the surrounding area, primarily through airborne emissions and disposal practices from smelting operations.

The Anaconda Smelter NPL Site has been divided into several operable units (OUs), two of which have not been completed: the community Soils OU and the Anaconda Regional Water, Waste, and Soils (ARWWS) OU. The study area for the Community Soils OU, as well as the ARWWS OU, covers approximately 300 geographic sections (1-square mile each) and includes the communities of Anaconda, Opportunity, Fairmont, Galen, and Warm Springs (Figure 2). The Community Soils OU, for which this Record of Decision (ROD) has been prepared, addresses all residential and commercial/industrial soils throughout the NPL Site. The Community Soils OU Remedial Investigation/Feasibility Study (RI/FS) (AGC 1996a) characterizes residential and commercial/industrial soils and railroad beds, and provides a procedural means to identify and evaluate alternatives that remedy human health risks in residential and commercial/industrial areas within the site.

The Community Soils area of concern is generally bounded on the east and south by the border of Deer Lodge and Silver Bow Counties, on the west by the Anaconda West Valley, and on the north by the border of Deer Lodge and Powell Counties. The majority of this land is classified as rural. The Community Soils OU consists of the five communities within this area, and all other residential areas within the Anaconda Smelter NPL Site. The five communities included in the study area have a combined population of under 8,600 (Peccia & Associates 1992).

Prior to closure of smelter operations in 1980, the Anaconda Smelter was a source of substantial air emissions at the site. The distance and direction of each of the five communities from the stack located on Smelter Hill are: Anaconda, less than one mile northwest; Opportunity, 3.0 miles east; Fairmont, 6.8 miles southeast; Warmsprings, 7 miles northwest; and Galen, 10.4 miles northeast. Other sources of aerial contaminants related to the Anaconda milling and smelting operations have also contributed to community soils contamination.

Major drainages within the site include Warm Springs Creek, Mill Creek, Lost Creek, and Silver Bow Creek. These creeks drain the Anaconda area and surrounding mountains and eventually flow east and north where they enter the Clark Fork River drainage system.

Topography in the Anaconda area varies from floodplain to steeply sloping hills. South of the area, the Pintler Mountains rise to above 10,000 feet. Northwest of the area is the Flint Creek Range, and southwest is the steeply rising Anaconda Range.

The climate for this area is characterized as semi-arid, with moderate wind conditions, long, cold winters, and short and cool summers. The average annual temperature measured in Anaconda is 43° F. Weather data collected for the period of 1951 to 1980 in East Anaconda indicate the annual average precipitation is approximately 14 inches per year.

2.0 OPERABLE UNIT HISTORY AND ENFORCEMENT ACTIVITIES

Around 1884, the Anaconda Mining Company (AMC) and its predecessors commenced large copper concentrating and smelting operations at the area presently known as the Old Works. The Old Works was located on the north side of Warm Springs Creek, west of Anaconda, and operated until about 1901. In about 1902, ore processing and smelting operations began at the Washoe Reduction Works (also called the Anaconda Smelter, the Washoe Smelter, the New Works, and the Anaconda Reduction Works) on Smelter Hill, south of Warm Springs Creek across from the Old Works which was owned and operated by AMC, its successors, and/or its subsidiaries. In 1977, Atlantic Richfield Company (ARCO) purchased AMC and expressly

assumed its liabilities. Operations at the Anaconda Smelter ceased in 1980, and the smelter facilities were dismantled soon thereafter. The only substantial feature remaining from the smelter facility is the large brick smelter stack on Smelter Hill. Arco has been identified as the Potentially Responsible Party (PRP) for this site.

The Anaconda Smelter NPL Site was placed on the NPL in September 1983, under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The U.S. Environmental Protection Agency (EPA) issued both general and special notice letters to ARCO on several occasions and ARCO has been actively involved in conducting investigations and response actions at the site since that time. On April 12, 1984, ARCO entered into an Administrative Order on Consent (AOC) with EPA to conduct demolition activities at the smelter. In October 1984, ARCO entered into another AOC to conduct several investigations at the Anaconda Smelter NPL Site to characterize soils, surface water, groundwater, and solid wastes. Early draft reports based on initial investigations indicated wide-spread contamination and the need for more in-depth study.

In the initial stages of the investigations, it was discovered that the soils within the community of Mill Creek, located two miles east of Anaconda, had elevated levels of arsenic. Children in Mill Creek also had elevated urinary arsenic levels, indicating an excess exposure to arsenic in their environment. Families with young children were temporarily relocated from the community in May 1986. At that time, flue dust, the most concentrated arsenic and heavy metal source on the site, was sprayed with surfactant to reduce fugitive emissions, and contaminated road dust in the community was treated to reduce inhalation exposures. Following temporary relocation, none of these children had levels of urinary arsenic above the levels of concern as determined by the Center for Disease Control.

In July 1986, EPA entered into an AOC with ARCO to conduct an expediated RI/FS for the Mill Creek community. The ROD for Mill Creek was completed in October 1987. The selected remedy was the permanent relocation of all Mill Creek residents. EPA negotiated a Consent Decree with ARCO concerning the implementation of the relocation remedy for Mill Creek residents on January 7, 1988. The permanent relocation was completed in fall 1988.

The generation and airborne transport of stack particulate and fugitive dust emissions during smelting operations also resulted in contamination of soils and household dust by arsenic, cadmium, copper, lead, and zinc in other areas surrounding the smelter. In addition, it was suspected that contaminated material from the Old Works Smelter facilities was present around homes in three Anaconda neighborhoods (Teresa Ann Terrace, Elkhorn Apartments, and Cedar Park Homes).

On September 28, 1988, ARCO entered into an AOC (Docket No. CERCLA VIII-88-06) with EPA to conduct an Engineering Evaluation/Cost Analysis (EE/CA) study and investigation for the Old Works and Community Soils OUs of the Anaconda Smelter NPL Site. Results of sampling conducted by ARCO in 1988-1989 in the areas of Teresa Ann Terrace, Elkhorn Apartments, and Cedar Park Homes indicated the presence of elevated heavy metal concentrations at or near the soil surface. Sampling conducted by ARCO in 1990 confirmed the presence of elevated concentrations of heavy metals in several yards, gardens, and common areas of the three neighborhoods.

A September 17, 1991, an Action Memorandum (with a concurrent AOC) required ARCO to conduct a Time-Critical Removal Action (TCRA) by excavating and removing contaminated soils in areas of Teresa Ann Terrace, Elkhorn Apartments, and Cedar Park Homes where arsenic concentrations exceeded 250 milligrams per kilogram (mg/kg). Under the TCRA, removal of arsenic-contaminated soils to 18 inches and replacement of topsoil and grass began in late 1991 and was completed in September 1992. Removal occurred on about 8 acres of undeveloped lots and 19 yards in Teresa Ann Terrace, on 32 yards around the Elkhorn apartments, and on 14 yards around Cedar Park Homes.

In 1991, ARCO and EPA amended an AOC (Docket No. CERCLA VIII-88-16) to conduct the Anaconda Soils Investigation to provide information to support future RI/FS activities at the Anaconda Smelter NPL Site. The investigation focused on five geographic areas: community soils; near community soils; community targeted soils; regional soils; and regional targeted soils. One of the primary objectives of this investigation was to delineate the nature and extent of metals contamination resulting from airborne particulate deposition.

In 1992, ARCO initiated an Arsenic Exposure Study through the University of Cincinnati, to measure arsenic in Anaconda residents and evaluate possible exposure pathways. Several hundred families participated in this study to provide environmental (i.e., soil, dust, food, and water) and biological (i.e., urine) data. Data from this study was utilized by EPA in the Final Baseline Human Health Risk Assessment (HHRA) for the Anaconda Smelter NPL Site (CDM) Federal 1996a).

Also in 1992, EPA and ARCO further amended AOC 88-16 to conduct the Old works/East Anaconda Development Area (OW/EADA) OU investigations. The March 1994 ROD for the OW/EADA OU selected a combination of engineering and institutional controls (ICs) as the remedy. Remediation of recreational and commercial/industrial areas was conducted where waste and soils exceeded arsenic levels of 1,000 and 500 ppm, respectively.

In early 1994, EPA began the scoping process for the human health risk assessment, culminating in the completion of the Final Baseline HHRA in January 1996.

In 1995, ARCO and EPA entered into the 8th Amendment to AOC 88-16 to conduct a Phase I Soils Remedial Investigation from previous studies to support both the Community Soils and ARWWS OUs. This investigation contains the completed characterization of residential soils at the site. The Feasibility Study (FS) portion of this Community Soils RI/FS was conducted under the 7th Amendment to the AOC in 88-16.

The Community Soils OU addresses all remaining residential and commercial/industrial soils of the Anaconda Smelter NPL Site. This OU will also bring closure to previous actions conducted at residential properties within the site (i.e., Community Soils TCRA and actions taken through the County's Development Permit System) as well as commercial/industrial properties. Other cleanup actions, not related to soil contamination, have been selected and implemented at the Anaconda Smelter NPL Site.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public participation is required by CERCLA Sections 113 and 117. These sections require that before adoption of any plan for remedial action to be undertaken by EPA, the State, or an individual (PRP), the lead agency shall:

1. Publish a notice and brief analysis of the Proposed Plan and make such available to the public.

2. Provide a reasonable opportunity for submission of written and oral comments and an opportunity for a public meeting at or near the site regarding the Proposed Plan and any proposed findings relating to cleanup standards. The lead agency shall keep a transcript of the meeting and make such transcript available to the public. The notice and analysis published under item #1 above shall include sufficient information to provide a reasonable explanation of the Proposed Plan and alternative proposals considered.

Additionally, notice of the final remedial action plan set forth in the ROD must be published and the plan must be made available to the public before commencing any remedial action. Such a final plan must be accompanied by a discussion of any significant changes to the preferred remedy presented in the Proposed Plan along with the reasons for the changes. A response (Responsiveness Summary) to each of the significant comments, criticisms, and new data submitted in written or oral presentations during the public comment period must be included with the ROD.

EPA has conducted the required community participation activities through presentation of the RI/FS and Proposed Plan, a 30-day public comment period, a formal public hearing, and presentation of the Selected Remedy in this ROD. Specifically included with this ROD is a Responsiveness Summary that summarizes public comments and EPA responses.

The RI/FS and Proposed Plan for the Community Soils OU were released for public comment on July 8, 1996. The RI/FS and Proposed Plan were made available to the public in both the Administrative Record located at the EPA Record Center in Helena and the Hearst Free Library in Anaconda. The Proposed Plan was distributed to the parties on the EPA Anaconda mailing

list (approximately 350 residents) and also made available at several locations in Anaconda. The notice of availability of the RI/FS and Proposed Plan was published in the Anaconda newspaper, The Anaconda Leader, July 5 and 10, 1996. A formal public comment period was designated from July 8 through August 90, 1996.

In addition, numerous public meetings and distribution of site information have been provided by EPA. The most recent update of Superfund activities was provided in a March 1996 fact sheet, and EPA held an informational meeting in Anaconda on March 14, 1996, to explain the RI/FS process and to discuss overall site progress, activities, and schedules.
A formal public hearing was held in Anaconda on July 18, 1996. At this hearing, representatives from EPA answered questions about remedial alternatives under consideration, as well as the preferred remedy. A portion of the hearing was dedicated to accepting formal oral comments from the public. A court reporter transcribed the formal oral comments and EPA made the transcript available by placing it in the Administrative Record. A response to the comments received during the public comment period is included in the Responsiveness Summary, which is part of this ROD. Also, community acceptance of the Selected Remedy is discussed in Section 8.0, Summary of Comparative Analysis of Alternatives, of this Decision Summary.

4.0 SCOPE AND ROLE OF OPERABLE UNIT

The Anaconda Smelter Site covers a wide area (Figure 2) and is currently organized into the following OUs:

- Anaconda Smelter Demolition and Initialization Stabilization Actions
- Mill Creek Children Relocation Removal Program
- Mill Creek Relocation Remedial Action
- Anaconda Yards Time Critical Removal Action
- Arbiter Non-Time Critical Removal/Beryllium Non-Time Critical Removal Action and Repository Construction
- Old Works Stabilization Removal Action
- Flue Dust Remedial Action
- Old Works/East Anaconda Development Area Remedial Action
- Community Soils Remedial Action
- Anaconda Regional Water, Waste, and Soils Remedial Action

The OUs were prioritized based on their potential risk to human health and the environment. Mill Creek was considered the highest priority and EPA relocated Mill Creek residents in 1988. Since then, EPA has also taken action at several other areas, including Flue Dust, Arbiter, Beryllium, OW/EADA, and Community Soils. Completion of the Community Soils OU is considered the next priority because of the potential exposure of remaining residents to elevated arsenic concentrations.

The Conceptual Site Management Plan (SMP) was formally revised in October 1995, with the Community Soils and ARWWS OUs identified for remaining ROD completion. A brief description of the Community Soils and ARWWS OUs is provided below:

Community Soils Operable Unit. The Community Soils OU will address residential soils throughout the entire Anaconda Smelter NPL Site, including potentially contaminated soils and wastes in the communities of Anaconda, Fairmont, Galen, Opportunity, and Warm Springs, as well as rural residential areas. This includes all land use areas (i.e., residential commercial/industrial, and recreational) within these general residential areas. The Community Soils RI/FS will primarily address human health risks from contact with contaminated soils and will result in the development of a residential soil action level for arsenic to be used sitewide.

Anaconda Regional Water, Waste, and Soils Operable Unit. This OU combines the former Anaconda Regional Water and Waste, Anaconda Soils, and Smelter Hill OUs. No further activities will be required under the Anaconda Soils and Smelter Hills OUs. The ARWWS OU is intended to be the last OU of the Anaconda Smelter NPL Site and will address all remaining issues not addressed under the other remedial actions. This OU will continue to address potential impacts to surface and groundwater from soils and waste sources such as tailings and slag. This OU will address both the human and environmental risks associated with site-related contamination that have not been addressed by other OUs.

The scope of the Community Soils OU, as defined in the Anaconda Smelter NPL Site, Community Soils RI/FS Work Plan (ARCO 1994), is to address all residential areas within the NPL Site. These generally include the communities of Anaconda, Opportunity, Warm Springs, Galen, and Fairmont, and also include adjacent rural residential areas. Residential area include all land uses (i.e., residential, commercial/industrial, and recreational) within the general residential or community setting. Areas of concern within these communities generally include yard areas and other areas frequented by children (i.e., playgrounds and schools). In addition, potential source areas within the communities, including railroad beds and imported waste/fill areas in both residential and commercial/industrial areas, will also be addressed. Remediation of ground and surface water is outside the scope of this project and will be evaluated, along with other contamination, under the ARWWS OU.

The purpose of the Community Soils OU RI/FS was to gather sufficient information to support an informed risk management decision for remediating potential human health risks in residential and commercial/industrial areas of the site. The RI/FS was performed in accordance with EPA guidance (EPA 1988), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, and CERCLA Section 104, 42 U.S.C. Section 104, 42 U.S.C. § 9604.

The objectives of the RI/FS were to:

- characterize the nature and extent of arsenic and metals in community and regional soils, including the railroad bed materials;
- identify potential receptors, exposure patterns, food chain relationships, and the human health risks posed at the site from soil contamination;
- identify potential soil areas of concern based on arsenic and other metals concentrations, potential risks, and the current or reasonably anticipated future land use that may require development of remedial alternatives;
- determine the effectiveness of soil treatment on arsenic in soils through treatability studies;
- further define or modify each of the alternatives listed in the work plan, with respect to areas of concern and the technologies to be used, to be assessed in this FS;
- analyze each of the FS alternatives against the NCP (40 C.F.R. 300.430) criteria; and
- compare the relative performance among each alternative with respect to the evaluation criteria.

Based on the findings of previous investigations and the results of the Community Soils OU RI/FS (AGC 1996a), the sources and areas of contamination at the Community Soils OU have been adequately delineated to evaluate alternatives in the RI/FS.

This ROD was prepared according to EPA guidance (EPA 1989). The remedy outlines in this ROD is intended to be the final remedial action for residential and commercial/industrial soils within the Community Soils OU. It is also intended to be the final remedial action for waste materials (i.e., railroad beds) within the communities. The primary purpose of the remedy presented in this ROD is to prevent human exposure, by inhalation and ingestion, to contaminated soil and smelter waste materials. Remedial actions for other media (e.g., ground and surface water and environmental risk) are deferred to the ARWWS OU. Remedial actions undertaken at the Community Soils OU are intended to be consistent with the remedial action objectives and goals identified for the ARWWS OU.

5.0 SUMMARY OF SITE CHARACTERISTICS

Approximately 100 years of smelting operations at the Anaconda Smelter NPL Site have produced airborne particulate matter that has resulted in widespread contamination of arsenic and metals in near-surface soils. In addition, waste piles and other waste disposal areas have also contributed to fugitive dust and air particulate fallout in the investigation area. As a result of upvalley/downvalley air flows from the surrounding mountain ranges and bimodal distribution of the wind flow patterns, airborne particulates have generally been deposited radially from the former emission sources (Old Works and Washoe Works sites).

Soils data indicate that elevated arsenic and metals concentrations are found in residential areas, both in Anaconda and adjacent rural areas. Elevated concentrations in the community of Anaconda are highest in the eastern portion of the city, which is closest to the primary source, the stack. The highest concentrations in the rural areas can be found between Anaconda and Opportunity in a somewhat triangular area running northwest from south of the stack on Smelter Hill to an area north of the airport. The area roughly approximates the primary directions of wind flow in the area.

Elevated concentrations of arsenic and metals in railroad beds constructed primarily by a subsidiaries or related corporations of the Anaconda Copper Mining Company, both in Anaconda and regionally, indicate that sections of the railroad beds were likely constructed of materials from the Anaconda or Butte mining/smelting operations.

Air monitoring data collected over a three-year period (1989-1992) found no exceedances of

federal or state ambient air quality standards, indicating that air quality is not currently adversely affected by the contaminated soils present at the site. However, visual observations of wind erosion have been noted at the site.

Since 1985, numerous regional and community soil investigations have been completed at the site. The Community Soils RI/FS Report (AGC 1996a) characterizes the nature and extent of contaminated soils in residential areas and summarizes the risks associated with those contaminants to human health. The nature and extent of soils of contamination is detailed in the Soils Characterization Report (AGC 1996b). Potential human health risks are detailed in the Final Baseline Human Health Risk Assessment (CDM Federal 1996a). In addition, the RI/FS Report identifies the current and reasonably anticipated future land use for the NPL Site. The chemicals of potential concern for the community Soils OU are arsenic and lead in residential soils. Other media, such as non-residential soils, groundwater, surface water, soils outside of the Community Soils OU, and waste sources, will be addresses under the ARWWS OU.

Media evaluated include air, surface and subsurface soils, and railroad bed material. The following sections summarize the nature and extent of contamination for each of these media.

5.1 AIR

Air was identified as one of the transport pathways of concern at the Anaconda Smelter NPL Site based on historical observations of fugitive dust. Ambient air monitoring was conducted during a three year period and documented in the Aerometric Monitoring Reports for the Anaconda Smelter Remedial Investigation and Feasibility Study Air Resources Program, published quarterly and summarized annually in 1989 through 1992 (McVehil-Monnett Associates 1990, 1991, and 1992.)

The air monitoring program utilized four stations equipped with high volume PM-10 samplers, 13 dustfall stations, and three meteorological stations. The PM-10 stations measured the 24-hour concentrations of PM-10 particulates as well as concentrations of total arsenic, beryllium, cadmium, copper, lead, and zinc in particulate with a diameter of less than 10 microns. Dustfall buckets were used to measure the monthly concentration of Settled Particulate Matter (SPM) at the site. Meteorological information was collected at Sites 1, 3, and 4 (Figure 3). Wind direction and wind speed were monitored at all three meteorological stations. Additional information such as temperature. relative humidity, solar radiation, pan evaporation, and precipitation were recorded at the Mill Creek Park station (Site 3).

The principal wind direction for Sites 1 (Teresa Ann Terrace) and 4 (Zinc Processing Area) is from the west and is attributed to the orientation of the warm Springs Creek Valley. The predominance of wind from the west at these two locations is due to both channeling of winds by the valley sidewalls, and nighttime down-valley flow of cold air masses. Wind direction ad Site 3 (Mill Creek Park) is primarily from the southwest, in a similar orientation to that of the Mill Creek Valley. Channeling of wind in primarily a down-slope direction, but also occasionally in an up-slope direction, was observed in the Mill Creek Valley.

During the three annual monitoring periods, there were no exceedances of federal ambient air quality standards, which include standards for 24-hour and annual average PM-10 mass concentrations and quarterly-averaged lead concentrations. There also were no exceedances of the State of Montana ambient air quality standards for PM-10, quarterly lead, or PM-10 metals.

Linear regressions between PM-10 and trace elements results at each PM-10 station were performed for each annual sampling period. Based on the statistical analyses, correlations ranged from none to strong between PM-10 and each metal at the four sample stations. The strongest correlations were observed at the Zinc Processing Area station (Site 4) where the correlation coefficient (3-year average) ranged from 0.24 for beryllium to 0.80 for copper and zinc. Average correlation coefficients from the Teresa Ann Terrace (Site 1), Kortem Storage (Site 2), and Mill Creek Park (Site 4) ranged from 0.07 to 0.64. However, because of the low concentrations, the correlations show no apparent trends over the three year sampling period and were generally inconclusive.

Four exceedances of the State of the Montana ambient air quality guidelines for non-criteria air pollutants were observed, three at the Zinc Processing Area station (two copper, one arsenic) and one at the Mill Creek Park station (arsenic). There were also a total of 21 exceedances of

the State of Montana air quality standard for SPM during the three year monitoring period.

5.2 SURFACE SOILS

5.2.1 BACKGROUND SOIL CONCENTRATIONS

Soil, air, and groundwater arsenic, cadmium, and lead background concentrations were compiled in the Final Remedial Investigation Report, Mill Creek, Montana, Anaconda Smelter Superfund Site (ARCO 1987). In addition, a literature review of environmental media, including soils, was conducted as part of a public health and environmental assessment in the Rocker and Ramsey areas (CH2MHill/Chen-Northern 1989). For the baseline HHRA (CDM Federal 1996a), regional background values for arsenic, cadmium, and lead cited in the Mill Creek Remedial Investigation (RI) report (ARCO 1987) (and included in the CH2MHill/Chen-Northern, 1989, literature review) were considered the most appropriate background values for the Anaconda area. Samples from non-impacted areas of Helena Valley, Philipsburg, Townsend, and Livingston were used to establish regional background levels. These communities were generally similar to those of Deer Lodge Valley. Upper and lower 95% confidence intervals around the geometric mean were calculated to establish ranges of background soil metals concentrations. Based on these data, the following ranges of background soil concentrations (in mg/kg) for arsenic, cadmium, and lead were established:

Arsenic	6-16
Cadmium	0.5-1.4
Lead	18-70

Although the Mill Creek RI report did not establish background concentrations for copper and zinc, these data were available for the same Helena Valley (zinc only), Philipsburg, and Townsend stations used to estimate background concentrations for arsenic, cadmium, and lead. Using similar statistical analysis, the following ranges of background soil concentrations (in mg/kg) for copper and zinc were established:

Copper	17-29
Zinc	56-78

5.2.2 SURFACE SOIL DATA

Analytical data from previous site investigations (Table 1) includes more than one thousand concentration values at locations covering an area of approximately 300 square miles. The magnitude and extent of arsenic, cadmium, copper, lead, and zinc concentrations on surface (0 to 2 inch) soils in the community and regional areas has been characterized by compiling these analytical data into databases for three separate areas: the Anaconda community, Opportunity community, and the Regional area.

Kriging exercises were conducted for surface soil concentrations of several metals in the three areas. Kriging is a geostatistical method that was used to predict concentrations between known sample values and was used to characterize the surficial soil data for the site. The metals studied in each of the two communities were arsenic, cadmium, and lead. Metals studied regionally were arsenic, cadmium, copper, lead, and zinc.

The geostatistical methods used in this study are referred to as ordinary and general relative kriging. Ordinary and general relative kriging enables an estimation of values at a point, or within an area for which there are few or no sample values, based on a set of neighboring values. It produces a regular grid of interpolated point or block estimates and the kriging standard deviation. The estimates are calculated from a weighted average of neighboring sample values that are located within a specified radius of influence. Kriging also provides a measure of the reliability of the estimates, because it takes into account the spatial variability of the data. At the Anaconda Smelter NPL Site, the spatial variability of metals concentrations in surficial soil is partly attributed to the dispersion of airborne particulates from the former Anaconda Smelter stack. Further discussion of the methods used, results, and limitations, is provided in the Soil Characterization Report (AGC 1996b).

Results presented in the Soils Characterization Report are based on kriging efforts (model selection, data set preparation, project-specific assumptions) conducted by ARCO's contractors

in consultation with EPA. These kriging results have been determined to be sufficient for the purpose of the Community Soils RI. Other methods of kriging using different models, data sets, and assumptions may produce slightly different but still valid kriging results.

A summary of all the kriging results is presented in Table 2 for the three areas. An initial screening of the soil concentration data eliminated cadmium, copper, and zinc from further consideration from a human health standpoint, and only arsenic and lead were fully evaluated in the Final Baseline HHRA (CDM Federal 1996a). Therefore, for the following summaries, only the results for arsenic and lead are discussed. A complete discussion of all results is provided in the RI/FS report (AGC 1996a).

Results - Anaconda

The kriging block size for Anaconda was set to match the size of the city blocks in the central and eastern parts of town, and a total of 551 blocks were included in the kriging effort.

- Arsenic. Estimated concentrations of arsenic within the kriged blocks in Anaconda range from 72 to 514 mg/kg, with an arithmetic mean concentration of 186 mg/kg. Estimated concentrations of arsenic are highest in the eastern portion of Anaconda, which is closest to the primary source, the smelter stack. The highest estimated concentrations of arsenic are generally in commercial/industrial areas. Within residential areas, estimated arsenic concentrations range from 72 to 316 mg/kg. Kriged blocks in residential areas with soil arsenic concentrations greater than the 250 ppm action level are shown in Figure 4.

- Lead. Estimated lead concentrations within the kriged blocks range from 111 to 698 mg/kg, with arithmetic mean of 328 mg/kg. The highest estimated concentrations of lead are found in central Anaconda.

Results - Opportunity

The kriged area for Opportunity includes 360 3-acre blocks. The majority of these are within the core of the community, where land use includes residential, public/institutional, commercial/industrial, recreational, and agricultural. The remainder are in the area outside the core, where land use includes open space, pasture, and agriculture.

- Arsenic. Estimated concentrations of arsenic within the kriged blocks in Opportunity range 98 to 230 mg/kg, with an arithmetic mean concentration of 154 mg/kg. Overall, the highest estimated arsenic concentrations are found on the west side of opportunity, in areas used as open space or agricultural. No blocks exceeded the soil arsenic concentration action level of 250 ppm.

- Lead. Estimated concentrations of lead within the kriged blocks range from 101 to 238 mg/kg, with an arithmetic mean concentration of 153 mg/kg. The estimated lead concentrations are highest in the edges of the community, particularly to the south. These concentrations are below the lead concentrations seen in Anaconda.

Results - Regional

The regional kriging was conducted using a block size of 70 acres and a grid consisting of 3,033 cells.

- Arsenic. Estimated arsenic concentrations in the regional kriged blocks range from 29 to 1,856 mg/kg, with an arithmetic mean concentration of 195 mg/kg. Estimated concentrations of arsenic exceed 1,000 mg/kg in 32 blocks. The highest estimated arsenic concentrations are found in the rural areas between Anaconda and Opportunity in a somewhat triangular area running northwest from just behind Smelter Hill to the area just beyond the airport. The orientation of the area roughly approximates the primary direction of wind flow in the area. Those blocks which kriging shows to have soil arsenic concentrations greater than the 250 ppm action level are shown in Exhibit 1.

- Lead. Estimated concentrations of lead within the kriged blocks range from 16 to 825 mg/kg, with an arithmetic mean of 127 mg/kg. The highest concentrations are found within the Smelter Hill area as well as northwest and west of the area. Some of the higher concentrations are also found west of Anaconda.

5.3 SUBSURFACE SOILS

Subsurface soil samples were collected in most of the previous investigations. The majority were collected from soil profile sampling stations, where samples were collected from various depth intervals. The number of intervals sampled varied between investigations, but the most common intervals were: 0 to 2 inches, 2 to 10 inches, and 10 to 24 inches. The following is a review of the magnitude and extent of metals distribution in the subsurface soil. Table 3 provides a summary of subsurface soil samples for community and regional locations.

In Anaconda, arsenic concentrations in the 2- 10-inch interval ranged from 16 to 326 mg/kg, with an arithmetic mean of 140 mg/kg. Only five of the 41 samples had arsenic concentrations that exceeded 250 mg/kg. Four of these samples were located in residential areas. Lead concentrations in the 2- to 10-inch interval ranged from 9 to 390 mg/kg, with an arithmetic mean of 111 mg/kg.

There are 35 profile stations with a total of 96 samples in Anaconda. These include 62 subsurface and 34 surface samples. Arsenic concentrations decrease with depth at a majority of the stations. At stations where the increases occur, the increases do not appear to be statistically significant. Five of the 15 station with increases have arsenic concentrations over 250 mg/kg.

In Opportunity, arsenic concentrations in the 2- 10-inch interval ranged from 18 to 125 mg/kg, with an arithmetic mean of 71 mg/kg. Lead concentrations in the 2- to 10-inch interval ranged from 9.4 to 63 mg/kg, with an arithmetic mean of 40 mg/kg.

Soil profile samples in Opportunity include 41 samples from 16 stations. These include 25 subsurface samples and 16 surface samples. Arsenic concentrations decrease with depth at 15 of 16 stations. At the single station with an increase, the concentration was above 250 mg/kg.

In regional subsurface samples, arsenic concentrations in the 2- to 10-inch interval ranged from 2 to 2,440 mg/kg, with an arithmetic mean of 237 mg/kg. Lead concentrations in the 2- to 10-inch interval ranged from 6 to 4,550 mg/kg, with an arithmetic mean of 88 mg/kg. Most samples with the highest arsenic and lead concentrations are located in the Smelter Hill area.

Regional profile samples include 907 samples collected from 367 stations, including 544 subsurface samples and 363 surface samples. Arsenic concentration decreases with depth at most stations. At the 46 stations where increases occur, most increases are less than 100 mg/kg and do not appear to be statistically significant.

5.4 RAILROAD BEDS

The following is a review of the nature and extent of metals distribution in the upper 24 inches of the Anaconda and the regional railroad bed material. Table 4 provides a summary of railroad bed samples and locations. Detailed information regarding individual sampling events is provided in the Soils Characterization Report (AGC 1996b).

Results - Anaconda

The Anaconda railroad database contains 79 samples from three intervals: 0 to 2 inches, 29 samples; 2 to 10 inches, 25 samples; and 10 to 24 inches, 25 samples. Sampling locations with the highest surface samples highlighted are shown in Figure 5.

- Arsenic. Concentrations in the surface interval range from 213 to 3,780 mg/kg with an arithmetic mean concentration of 1,285 mg/kg. Sixteen of the 29 surface samples exceed 1,000 mg/kg and seven of these are located in or immediately adjacent to residential areas. In the 2- to 10-inch interval, arsenic concentrations range from 45 to 12,200 mg/kg, with an arithmetic mean of 1,398 mg/kg. Arsenic concentrations in the 10- to 24-inch interval samples range from 6

to 3,410 mg/kg, with an arithmetic mean of 831 mg/kg.

- Lead. Concentrations in the surface interval range from 152 to 2,760 mg/kg, with and arithmetic mean of 959 mg/kg. Four of the 8 surface samples in the upper quartile are near residential areas. In the 2- to 10-inch interval, lead concentrations range from 32 to 3,700 mg/kg, with an arithmetic mean of 681 mg/kg. Lead concentrations in the 10- to 24-inch interval range from 12 to 1,230 mg/kg, with an arithmetic mean of 375 mg/kg.

To provide a description of the nature and extent of contamination with depth, profiles in railbed materials were compiled from the three depth intervals at 25 stations. Arsenic concentrations decrease with depth at most stations. Arsenic concentrations, which remain elevated, are believed to be due to physical characteristics of the bed materials (i.e., waste material) used in railroad bed construction.

Results - Regional

Railroad beds on Smelter Hill were investigated to assess possible contamination in and along railbeds and adjacent soils in current and reasonably anticipated future residential areas (e.g., the Aspen Hills Subdivision). Samples were collected from the beds and adjacent soil pits along two primary tracks. Transects were spaced every 500 feet along the process tracks and every 1,000 feet along the loop tracks.

A total of 297 samples from 80 sampling stations are included in the railroad bed database. All stations were sampled at a depth of 0 to 2 inches, and most locations have three surface samples: one from the center of the tracks and one from 20 feet to either side of the track. Nineteen of the stations were sampled from both the 2- to 10-inch and 10- to 24-inch intervals, and three were sampled from one of three other intervals (14 to 24 inches, 18 to 24 inches, 18 to 24 inches, or 20 to 24 inches), for a total of 48 subsurface samples. Concentrations of all metals are elevated when compared to those for the regional soils.

- Arsenic. Concentrations in the surface interval range with an arithmetic mean of 2,140 mg/kg. In the combined subsurface intervals, arsenic concentrations range from 96 to 10,100 mg/kg, with an arithmetic mean of 2,023 mg/kg.

- Lead. Concentrations in the surface interval range from 122 to 13,800 mg/kg, with an arithmetic mean of 786 mg/kg. In the combined subsurface intervals, concentrations range from 122 to 5,520 mg/kg, with an arithmetic mean of 830 mg/kg.

Arsenic profiles were compiled from 3 depth intervals at 22 stations. The deepest sample profile is 24 inches. Arsenic concentrations decrease with depth at most of the stations. As with the Anaconda railroad bed, arsenic concentrations are believed to be due to physical characteristics of the original bed materials (i.e., waste material) used during the construction of the railway.

6.0 SUMMARY OF SITE RISKS

The Final Baseline HHRA provides the basis for taking action and indicates the exposure pathways to be addressed by the remedial action. It serves as the baseline for indicating risks that would exist if no action were taken at the site. This section of the ROD reports the results of the final Baseline HHRA conducted for the Anaconda Smelter NPL Site.

As part of the RI/FS, the Final Baseline HHRA was developed to assist EPA and the State of Montana Department of Environmental Quality (DEQ) in developing actions necessary to reduce actual and potential risks from hazardous substances at the site. The Final Baseline HHRA was conducted at the site with the following objectives:

- Provide an analysis of baseline risk (potential risk if no remedy occurs) and help determine the need for action;

- Provide a basis for determining cleanup or action levels (concentrations) that are protective of public health and the environment;

- Provide a basis to compare potential public health impacts of various cleanup alternatives; and

- Provide a consistent process to evaluate and document potential public health threats at the site.

6.1 CHEMICALS OF POTENTIAL CONCERN

Although smelting wastes contain a number of metals, experience at other mining and smelting sites and through previous Anaconda risk assessments (i.e., Mill Creek, Flue Dust, OW/EADA) has shown that risks to humans and the environment are dominated by the presence of arsenic, cadmium, copper, lead, and zinc. Some studies did collect data on other metals that might conceivably contribute to risk (e.g., antimony, radium, barium, beryllium, manganese, mercury), but the relative contribution of these other chemicals to total risk is believed to be sufficiently small compared to the risks from the primary chemicals of potential concern (COPCs) and were not considered further.

Therefore, arsenic, cadmium, copper, lead, and zinc were the main focus of sampling, and the analytical efforts performed at the site were considered for evaluation in the risk assessment.

Soil concentrations of cadmium, copper, and zinc were determined to be below health-based screening levels; therefore, those chemicals were not considered further in the risk assessment. Of the groundwater data available in areas where it is presently used for human consumption, only arsenic is present in concentrations indicating a potential health hazard. COPCs selected for the site are, therefore, arsenic and lead in soil and arsenic in groundwater.

Although groundwater is not within the scope of the Community Soils OU, risks from the consumption of water were evaluated to determine cumulative risks under the residential scenario. Evaluation of the water pathway will be addressed under the ARWWS OU.

6.2 POTENTIALLY EXPOSED POPULATIONS

A mixture of land uses in the study area suggest a variety of potential receptors. The focus of the Final Baseline HHRA was on area residents, since data for non-residential areas outside of the communities of Anaconda and Opportunity are sparse and insufficient to support quantitative assessment. According to the Anaconda-Deer Lodge County Comprehensive Master Plan (Peccia & Associates 1992), 471,350 acres of the 472,320 total acres of the county land area are identified as rural and the remaining 990 acres are urban. Much of the rural land is National Forest land used for conservation and recreational purposes. The majority of privately-owned land is agricultural.

There are five communities located in the study area with a total population of under 8,600. These include Anaconda and Opportunity, for which risks will be quantitatively evaluated, and Fairmont, Galen, and Warm Springs. Anaconda is the largest community, with a population of approximately 7,000 persons. Anaconda's public drinking water supply, which draws water from surface water and groundwater sources, is outside the area of potential impact of past smelter operations. Some homes in the Anaconda area, however, have private groundwater wells. Rural areas such as Galen. Opportunity, and Warm Springs, and rural farm residences use groundwater wells to provide drinking water.

Residents of Anaconda and other communities also participate in recreational activities such as dirt-bike riding, mountain biking, hiking, hunting, and swimming. These activities may result in exposure to arsenic and/or lead in soils within the study area.

In the future, areas of the site that are currently underdeveloped could be developed for a variety of purposes, including recreational, commercial, residential, or agricultural. Also, lands that are currently in use for agricultural purposes could be developed for other uses, such as residential development.

Based on current and reasonably anticipated future land uses, the following populations are

considered most likely to be exposed to COPCs at the NPL Site:

- Current and future residents
- Agricultural Workers
- Recreational users
- Commercial workers

6.3 IDENTIFICATION OF EXPOSURE PATHWAYS

The Site Conceptual Exposure Model (SCEM) (Figure 6) for the Anaconda Smelter NPL Site presents primary sources of contamination, primary release mechanisms, secondary and tertiary sources of contamination, and potential human receptors. The SCEM presents reasonable pathways of exposure from primary sources of contamination to potential receptors.

The two primary sources of contamination to surface and subsurface soils within the study area are historical air emissions from the Old Works and Anaconda Smelter stacks, and tailings and slag remaining from the smelting processes. The primary release mechanism for tailing and slag is wind erosion, although some release via infiltration/percolation and runoff has also occurred. Contamination in air emissions is transported via dry or wet disposition from the air into three secondary sources: soil, surface water, and sediment.

Exposure pathways of concern for the populations previously discussed are:

- Residents (adult and children 0 to 6 years)
  - Ingestion of surface soils
  - Ingestion of interior dust
  - Ingestion of groundwater

- Agricultural Workers (adults)
  - Ingestion of surface soils
  - Ingestion of dust

- Recreational Users (dirt bike riders)
  - Ingestion of surface soils
  - Inhalation of dust

- Recreational Visitors (swimmers)
  - Ingestion of surface water
  - Dermal exposure to surface water

- Commercial Workers (adults)
  - Ingestion of surface soils
  - Ingestion of interior dust

6.4 HUMAN EXPOSURE ASSUMPTIONS

In general, it is expected that different people living or working in an area may have different levels of contact with various contaminated media and, thus, result in different levels of exposure. Therefore, it is appropriate to think of exposure of a population as a range or distribution of values, rather than as a single value. In order to account for this, EPA calculates exposure both for an average person, and for someone at the upper end of the distribution (approximately the 95th percentile). The average exposure is termed Central Tendency Exposure (CTE), while the latter is termed Reasonable Maximum Exposure (RME). Both estimates are useful in understanding exposures and risks which can exist at a site.

Table 5 lists the parameters needed to calculate average and RME daily intake levels for each of the contaminated media for the residential populations of potential concern at the site. Some of these values are reasonably well established (e.g., body weight, water intake, exposure frequency of workers), but other values are based on site data (e.g., soil ingestion, arsenic bioavailability). Other values are based mainly on professional judgment.

Arsenic chronic daily intake (CDI) was estimated for each residential exposure pathway based on estimates regarding the extent, frequency, and duration of exposures and the exposure point

concentrations. Site-specific exposure assumptions were used when available; these include concentration estimates of arsenic in dust, soil, water, and diet. EPA has used available data to derive site-specific arsenic bioavailability estimates for ingested soil and dust (EPA 1994b and 1995). The following are the bioavailability values used in the Final Baseline HHRA:

- 25.8% bioavailability for dust
- 18.3% bioavailability for soil
- 100% bioavailability for water

Findings in the Anaconda Soil Ingestion study support the Superfund Program's usual approach of assuming ingestion of 100 milligrams (mg) soil and dust per day as a CTE assumption and 200 mg soil and dust per day as a RME assumption for ingestion rates of children 0 to 6 years old. Though default assumptions are used for soil and dust ingestion rates for children, these assumptions are clearly consistent with available site-specific data.

Predictions of exposure obtained from calculations of CDIs based on CTE assumptions were compared to measured levels of arsenic in the urine of children living in Anaconda. The arithmetic and geometric means of predicted and measured urinary arsenic concentrations for children were compared to evaluate the appropriateness of the exposure assumptions used. The Kruskal-Wallis one-way analysis of variance demonstrated that measured and predicted urinary arsenic are not statistically different. However, EPA exposure calculations underpredict urinary concentrations where measured levels are grater than 10 :g/L. Overall, the results of the comparison support the use of the described exposure calculations in the risk assessment for the Anaconda Smelter NPL Site. In addition, EPA provides a level of conservatism by using estimates off risk based on RME, or upper-bound, exposure assumptions, in accordance with EPA guidance.

6.5 EXPOSURE POINT CONCENTRATIONS

An exposure point is an area within the site where humans are expected to come into contact with one or more contaminated media. Typically, the boundaries of an exposure point are selected to represent an area over which exposure of an individual is expected to be approximately random. Based on this, the exposure point concentration for a chemical is defined as the upper 95th confidence limit of arithmetic mean (AM-95) of the measured values for that chemical within the exposure area (calculated based on the assumption of log normal distribution of measured values.

Soil, dust, and tap water data collected by the University of Cincinnati (Bornschein, 1992 and 1994) were used to evaluate risks. In this study, Anaconda was separated into subareas (A, B, C, D, E, F, I, and J) to better characterize possible differences in exposure conditions within the community (Figure 7). For the risk assessment, subarea F, the subarea closest to Smelter Hill, was subdivided into areas F1 and F2 to ensure that potential exposures in this area were adequately addressed. Opportunity was retained as a separate study area (subarea G). Numerous yards within each subarea were sampled and soil was collected from several locations within each yard, including play, house perimeter, garden, hardpack, and bare areas. Soil concentrations for arsenic and lead from all of these samples were averaged for each yard. Arsenic exposure point concentrations for soils of each subarea are shown in Table 6. Lead intake was evaluated by the integrated Exposure Uptake/Biokinetic (IEUBK) Lead Model, Version 0.99. Average lead concentrations in soils of each subarea, rather than the 95% Upper Confidence Limit (UCL) of the mean, are used as lead exposure point concentrations (Table 7).

6.6 QUANTIFICATION OF NONCANCER RISKS

Noncancer risk from a single chemical is usually described in terms of the Hazard Quotient (HQ). The HQ is the ratio of the estimated daily intake (CDI) of a single chemical received by a human exposed at the site, compared to a Reference Dose (RfD) that is believed to be without appreciable risk of adverse noncancer health effects.

If the value of HQ is equal to or less than one, it is concluded that the chemical does not pose a noncancer risk. If the value of HQ is greater than one, then there may be a risk of noncancer effects. In general, the likelihood of effect increases as HQ increases, but HQ values greater

than one do not imply an effect will necessarily occur.

For the Final Baseline HHRA, however, HQs were calculated only for arsenic. Lead risks were evaluated through the use of the EPA IEUBK Lead Model, Version 0.99. This model evaluates health based on blood-lead levels. It would be inappropriate to attempt to combine arsenic and lead toxicity values because of the different evaluation methodologies. Additionally, lead and arsenic do not induce similar toxic effects, nor does their toxicity occur through the same mechanism of action.

Table 8 presents noncarcinogenic HQs for ingestion of soils and dust, which range from about 0.1 to 0.3 for all subareas. The highest HQs are found in subareas D and F1, though differences among subareas are small. HQs based on CTE estimates are about 53% of those based on RME.

Potential risks due to ingestion of groundwater are similar to those for ingestion of soil/dust in subarea A and in Opportunity, and overall these risks fall in the lower half of the range of Hqs for soil/dust ingestion. The highest HQ (0.34 for subarea A) is less than 1, suggesting that exposures to arsenic in groundwater will not exceed the target HQ of 1.

All HQs estimated are less than unity, suggesting little potential for impacts to human health. Potential arsenic exposure in the communities of Anaconda and Opportunity does not appear to be associated with unacceptable non-cancer health risks.

6.7 POTENTIAL HEALTH RISKS ASSOCIATED WITH EXPOSURE TO LEAD

Risks from exposure to lead cannot be assessed using standard methods, because toxicological criteria for lead are not available.

The best available quantitative tool for evaluating health effects from exposure to lead is the IEUBK model (EPA 1994c). This model uses current information on the uptake of lead following exposure from different routes, its distribution among various internal body compartments, and its excretion, to predict impacts of lead exposure on blood-lead concentrations in young children. Predicted blood-lead concentration can then be compared with target blood-lead concentrations associated with subtle neurological effects in children. Because children are thought to be most susceptible to the adverse effects of lead, protection for this age group is assumed to also protect older individuals. Protection of young children is considered achieved when the model predicts that less than 5% of children will have blood levels greater than 10 :g/dL (EPA 1994d).

Table 9 summarizes the modeling results. Modeling predicted that 5% of children in exposure subarea E may have blood-lead levels in excess of 10 :g/dL. The estimated percentage of individuals in exposure subarea E having blood-lead levels above 10 :g/dL is 5.38. Based on the combined data for all subareas, only 0.687% of children are predicted to have blood-lead levels above 10 :g/dL.

Generally, EPA considers risk from exposure to lead unacceptable if more than 5% of the children have blood-lead levels in excess of 10 :g/dL (EPA 1994d). Although risk from lead exposure would be considered marginally unacceptable for exposure in Subarea E, lack of site-specific information (i.e., lead data from interior dust, lead bioavailability data) significantly increases the uncertainty of the predicted value. Use of conservative default assumptions in the IEUBK model have likely overestimated risks due to lead in this subarea.

6.8 QUANTIFICATION OF CANCER RISKS

Cancer risk is described in terms of the probability that a person exposed under a specified set of conditions will develop a tumor before the age of 70 as a result of that exposure. For example, if the probability were one out of one million (1/1,000,000), this is expressed as 1E-06. Typically, EPA considers remedial action at a site when excess lifetime cancer risk to any current or future resident falls within or exceeds a risk range of 1E-04 (1/10,000) to 1E-06 (1/1,000,000), with 1E-06 as a point of departure.

When data permit, EPA derives numeric values useful in quantifying the toxicity and carcinogenicity of a compound. Slope factors (SF) are route-specific estimates of the slope of the cancer dose response curve at low doses.

Table 10 presents pathway-specific and total cancer risks for RME and CTE scenarios. Potential risks based on RME estimates associated with ingestion of soil/interior dust are in the range of 2E-05 to 4E-05 for all subareas, reflecting the relatively homogeneous distribution of arsenic in the study area. The highest risks are estimated for subareas D and F1, perhaps reflecting the proximity of these areas to Smelter Hill. However, differences in risk estimates among subareas are small and may not be significant. Risks based on CTE estimates are about 16% of those based on RME.

Potential risks from ingestion of arsenic in groundwater are somewhat higher than those for soil/dust ingestion in subarea A and in Opportunity, although they still fall within EPA's targeted risk range. Groundwater risks were not evaluated for other subareas since data from these areas was lacking.

6.9 COMBINED RISKS

Residents of Anaconda and Opportunity might be exposed to both contaminated soil/dust and to contaminated groundwater. Thus, total risks for receptor populations may be higher than risks estimated for individual pathways. It may be appropriate to combine estimates if it is likely that the same individual might experience RME exposures in more than one pathway. For Anaconda and Opportunity, it is conceivable that the same individuals could be exposed at higher levels to both soil/dust and groundwater. In fact, within a single subarea, soil concentrations are relatively consistent, suggesting that the occurrence of high soil/dust levels and high local groundwater contamination in the same location is likely. Though this alone does not indicate that people at such locations will be maximally exposed to both soil/dust and groundwater, it does increase the likelihood for co-concurrence of such exposures. Thus, it seems reasonable to combine risks based on RME for subarea A and Opportunity.

Combined RME cancer risks for subarea A (5.3E-05) and Opportunity (5.5E-05) are still within the EPA's targeted risk range. Likewise, combined HQs (0.55 and 0.6 for subarea A and Opportunity, respectively) are still below the target HQ of 1. Thus, combining risks from the soil/dust ingestion and groundwater ingestion pathways does not result in a significant increase in risk estimates.

6.10 ANALYSIS OF UNCERTAINTIES

Quantitative risk estimates are based on site-specific information, national default assumptions, toxicology literature, and professional judgement. There are uncertainties associated with all of these sources, and hence, there is uncertainty in all quantitative estimates of risk. The Final Baseline HHRA (CDM Federal 1996a) was developed with the advantage of at least three large exposure studies which greatly improve confidence in the risk assessment: 1) the Arsenic Exposure Study identified individuals at risk of arsenic exposure as well as the types and specifics of these exposure conditions; 2) a Childhood Soil Ingestion Study (Calabrese) defined more reliable site-specific soil ingestion rates for this group of special concern; and 3) a study using primates (Freeman) measured absorption of arsenic from residential soils and dust from homes and yards in Anaconda. All these studies have been carefully reviewed and assessed by EPA toxicologists. All were considered in the development of the risk assessment and the development and selection of remedial action for this site.

Analysis of uncertainties in the above risk estimates suggests that it is unlikely that risks have been underestimated, especially for the well-characterized communities of Anaconda and Opportunity. It is reasonable to conclude that exposures calculated in this assessment are acceptable for calculating risk.

Although the communities are generally well-characterized, it is important to remember that the exposure point concentration term calculated for each subarea was based on an average of all the soil data within that exposure area. This means that some of the soil samples were higher than the concentration term and some were lower. Over a lifetime of exposure to these concentrations average out to present risks to arsenic that are within EPA's targeted risk range for the subareas evaluated in Anaconda and Opportunity. A concern exists, however, when some of those data points (which may be diluted in the calculation of the concentration term) turn out to be so elevated (i.e., hot spots) that a potential for short-term or acute risk occurs; or a person is preferentially exposed to a smaller more highly contaminated area.

Although a statistically significant number of samples were collected in each of the subareas to adequately characterize exposure in accordance with EPA guidance, not every single yard in Anaconda was sampled. Also, many of the areas surrounding Anaconda have not been adequately sampled yet. Therefore, screening levels were developed to assist in assessing areas where occasional hot spots of arsenic may occur. Screening levels were developed in the risk assessment and are provided in Table 11. For the residential scenario, the range of screening levels for soil arsenic concentrations encompass EPA's targeted risk range are 3 ppm (1E-06) to 297 ppm (1E-04).

6.11 SUMMARY

Cancer risks, calculated using averaged RME concentrations for soil/dust for all evaluated subareas of the site, fall into a narrow range of about 1E-05 to 3E-05. This narrow range reflects the relatively even distribution of arsenic within Anaconda and Opportunity. A similar narrow range of non-cancer risks (hazard quotients of 0.1 to 0.3) is estimated for the same exposures. Cancer risks estimates for all subareas are within EPA's targeted risk range of 1E-04-1E-06, but are greater than the 1E-06 point of departure. All hazard quotients fall below the target level of one.

In subarea A and in Opportunity, cancer risks, calculated using averaged RME concentrations for groundwater, are in the same range as those for exposure to soil/dust. This is also true for non-cancer risks. Combined cancer and non-cancer risks using averaged RME concentrations for groundwater and soil/dust (Subarea A and Opportunity) remain within the risk range, but are greater than the point of departure. This suggests that even where near maximum exposures to both groundwater and soil/dust occur simultaneously, exposures are not in excess of the targeted risk range established by EPA, but are greater than the point of departure.

Typically, EPA considers remedial action at a site when the excess cancer risk to any current or future population falls within or exceeds the targeted risk range. EPA considers a risk of 1E-06 as the point of departure for evaluating remedial actions. Although the results of the risk assessment indicate that risks calculated for each subarea are all within EPA's targeted risk range, individual yards within a subarea having elevated concentrations of arsenic (hot spots) could preferentially pose an unacceptable risk to those residents. In addition, rural residential areas that were not adequately sampled to allow a calculation of risk, may also have hot spots that could pose an unacceptable risk. Thus, EPA believes a remedial action is necessary to address those individual residential areas or hot spots within the Community Soils OU.

EPA generally considers risk from exposure to lead unacceptable if more than 5% of the children have blood-levels in excess of 10 :g/dl (EPA 1994c). Modeling predicted that 5.3% of the children in subarea E may have blood-lead levels in excess of 10 :g/dL. Although risk from lead exposure would be considered marginally unacceptable for exposure in Subarea E, use of conservative default assumptions in the IUEBK model will have likely overestimated this risk. Thus, EPA will not address risks to lead at the Community Soils OU.

Actual or threatened releases of hazardous substances from individual yards or hot spots, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

6.11.1 ACTION LEVELS

As discussed above, EPA believes that individual residential areas or hot spots within the Community Soils OU may pose an unacceptable risk. EPA also believes that the exposure estimates, considering uncertainties, calculated in the risk assessment are reasonable. Therefore, the range of screening levels (3 ppm to 297 ppm), that were developed for the targeted risk range of 1E-04 to 1E-06 in the risk assessment, are considered to be the appropriate range from which to select an action level for remediating hot spots.

First EPA determined that the appropriate remediation unit for a residential hot spot is the residential yard. The residential yard was chosen for the following reasons:

- Yards are an appropriate remediation management unit (i.e., property ownership);

- It is consistent with previous removal and remedial actions taken by EPA;
- Allows for consistent remediation of community and rural residential areas;
- Yards are defined as the unit to be addressed under the ADLC-DPS; and
- It is not unreasonable for an individual to remain in one residence for a long period of time, even a lifetime.

EPA then determined the arsenic action level for residential surficial soils to be 250 ppm. This corresponds to an excess cancer risk of 8E-05 and is within EPA's targeted risk range. Although the 250 ppm action level departs from EPA's 1E-06 point of departure, this action level is determined to be protective for the following reasons:

- The 250 ppm action level reflects detailed site-specific studies conducted in Anaconda that significantly reduce the uncertainty of the risk assessment. These studies provide site-specific parameters to replace standard EPA default assumptions which generates a greater degree of confidence in the range of screening values.
- The range of screening values were developed from conservative exposure point concentrations in the risk assessment. Samples collected from the risk assessment were chosen from areas likely to contain elevated concentrations, not a random average of a particular area. These data potentially elevated the exposure point concentrations adding conservatism to the calculated screening values.
- The 250 ppm action level is applied to a much smaller exposure area than those evaluated in the risk assessment. Although the excess cancer risk (8E-05) for the 250 ppm action level is greater than the existing range for the subareas (1E-05 to 3E-05), it is applied to a much smaller exposure area than the subareas that were evaluated in the risk assessment. This significantly decreases the chance of averaging out a higher concentration value within a yard as compared to the larger subarea.
- Cleaning up hot spots in excess of the 250 ppm action level is expected to reduce the overall risk in each subarea and the entire community of Anaconda to close to 1E-05 which approaches EPA's 1E-06 point of departure and the State of Montana's general goal of protection from environmental carcinogens at 1E-05.

In addition to the above, risk management considerations included the following:

- A 250 ppm action level was previously utilized in a removal action taken under the Community Soils OU; and
- A 250 ppm level is currently utilized in the Anaconda-Deer Lodge County Development Permit System.
- The 250 ppm action level incorporates a balancing of the NCP criteria used to select remedial actions that are protective, implementable and cost effective.

An arsenic action level of 500 ppm for surface soils and waste materials in commercial/industrial land use areas was previously identified in the OW/EADA OU ROD, and was based in the OW/EADA Baseline Risk Assessment. For consistency at the Anaconda Smelter NPL Site, it is EPA's intent to continue to apply this action level at remaining commercial/industrial land use areas throughout this Community Soil ROD.

6.11.2 ECOLOGICAL RISK ASSESSMENT

Environmental risks were not assessed under this OU as this is currently being assessed in an ecological risk assessment under the ARWWS OU.

7.0 DESCRIPTION OF ALTERNATIVES

7.1 SUMMARY OF ALTERNATIVES

A brief description of the site cleanup alternatives that were considered in the Community Soils RI/FS Report (AGC 1996,a) is provided below. These alternatives, initially presented in the Anaconda Smelter NPL Site Community Soils RI/FS Work Plan (ARCO 1994), were identified to meet the CERCLA Section 121 requirements for developing an appropriate range of options to undergo a detailed analysis. Alternatives identified in this section were selected based on the site conditions, previous remedial actions at residential sites, and the results of previous technology scoping activities at other Clark Fork River NPL Sites. These activities included identification, screening, and evaluation of potential general response actions, remedial technologies, and process options in accordance with 40 C.F.R. § 300.430 (e)(2)-(7).

The alternatives initially identified in the RI/FS Work Plan were modified in the FS analysis, as a result of additional information provided by the Soils Characterization Report and the Final Baseline HHRA. The alternatives were directed primarily at addressing residential yards, playgrounds and play areas, vacant lots, and parks where the public may have maximum exposure to contaminants (i.e., hot spots). In addition, alternatives were also directed at addressing railroad beds in the community of Anaconda. Alternatives were not developed specifically for commercial/industrial land use areas in the Community Soils FS. However, the alternatives developed for residential areas and railroad beds were appropriate for the commercial/industrial areas within this site. An explanation for the inclusion of commercial/industrial areas within this ROD is found in section 11.0

The remedial alternatives evaluated in the FS included two basic types of response actions: engineering controls and ICs. For residential soils, engineering controls included: in-place treatment, capping, and excavation and removal. ICs included a community education program designed to maintain existing or new engineering controls and a permitting program designed to clean up contaminated soils during new residential construction. For the railroad beds, engineering controls included: capping, separation barriers, and excavation and removal. Institution Controls included private property and governmental restrictions. In addition, the NCP and EPA guidance require EPA to consider a no action alternative as a baseline against which the other alternatives are compared.

All Alternatives presented in the FS were evaluated against the nine criteria described in the next section, and then compared with each of the other options. A description of the alternatives is provided below.

7.2 DESCRIPTION OF ALTERNATIVES CONSIDERED FOR RESIDENTIAL SOILS

The engineering and ICs identified above for residential soils were developed and refined during the FS process and assembled into the four alternatives listed below to provide a range of options from no action to excavation and disposal. These alternatives were intended to address residential soils where concentrations of arsenic exceed the final action level (250 ppm) for residential use. For the purpose of costing alternatives in the FS and the Proposed Plan, 10 to 50 yards were assumed to exceed the action level. It was also assumed for costing purposes that soil contamination is limited to the top several inches of the surface and the depth of remediation (removal or treatment) would only need to be implemented to six inches. As noted, these alternatives are also suitable for addressing commercial/industrial areas.

Alternative 1 - No Action

Estimated present worth cost: 0
Implementation time: 0

The NCP and EPA guidance require that EPA consider the no action alternative. This alternative is used as a baseline against which to compare other alternatives. Under Alternative 1, no further action would be undertaken. Contaminated soils would remain on site. The risk assessment was conducted to estimate risks posed by soil to human health in the absence of a remedial action. Individual yard areas with elevated soil arsenic concentrations pose a risk requiring action, as described in Section 5.0.

Alternative 2 - Institutional Controls

Cost per yard: Not Applicable
Estimated present worth cost: $1,369,325
Implementation time: 6 months

This alternative entails the establishment of a Community Protective Measures Program (CMPM), comprised of an educational/informational component and existing ICs.

The education/information component of this alternative would involve dissemination of written guidance for public agencies and residents describing risks and recommendations for addressing potentially contaminated soil. Information on concentrations of contaminants and their locations obtained through sampling would be maintained in a county database for public access. All soil sampling results and any pertinent changes in soil concentrations or covers would be recorded for use by regulators, prospective home buyers, lenders, contractors, and other interested parties. Additional educational measures would include the dissemination of materials designed to educate residents on the importance of maintaining a healthy lawn or adequate gravel cover on their property if they are within a designated area.

Existing ICs are those already included in the ADLC-DPS, within the Superfund Planning Area Overlay District. The DPL provides guidance on soils testing, soils remediation, and soils disposal in designated areas through the county's permit requirements and inspection procedures.

Alternative 3 - In-Place Treatment, Capping, and ICs

Cost Per Yard: $7,541
Estimated present worth cost: $1,394,731 - $1,496,358
Implementation time: 1 year

This remedial alternative consists of treating contaminated soils in residential yards by tilling to a depth necessary (6 inches assumed for costing purposes) to reduce arsenic concentrations to below the final risk-based action level for residential soils, and by adding soil amendments to further reduce the mobility of any remaining metals in the soil. The area would then be capped with soil, vegetation, gravel, or other equivalent barrier to protect the treated area. The Ics described in Alternative 2 would be used to promote maintenance of the cap and ensure proper handling of other soil on site.

Alternative 4 - Excavation and Disposal of Contaminated Soils and ICs

Cost per Yard: $10,089
Estimated present worth cost: $1,420.216 - $1,623,778
Implementation time: 2 years

This alternative would consist of removing contaminated soils (6 inches assumed for costing purposes) in residential yards above the final risk-based action level for residential soils and proper disposal in a designated on-site soil management area. Excavated areas would be backfilled with clean material and capped with vegetation, gravel, or other equivalent barrier. The ICs described in Alternative 2 would also be used to promote maintenance of the cap and ensure proper handling of other soils on site.

7.3 DESCRIPTION OF ALTERNATIVES CONSIDERED FOR RAILROAD BEDS

Three alternatives were developed and refined for the evaluation of railroad beds within the community of Anaconda. They are intended to address contaminated materials that were used to construct the railroad bed on the active railway operated by RARUS Railway Company, which runs through the residential portion of Anaconda. Concentrations of arsenic generally exceed 1,000 ppm throughout the profile and length of the railbed. Risks from these beds are generally limited to direct contact with contaminated material and the transport of contaminants to residential properties via dust and surface water runoff. For the purpose of costing alternatives in the FS and Proposed Plan, 1,000 to 3,000 linear feet of railroad bed in the residential areas were assumed to require remediation. As noted, these alternatives are also suitable for addressing commercial/industrial areas.

Alternative 1 - No Action

Estimated present worth cost: 0
Implementation time: 0

This alternative provides no new engineering controls or ICs. Its purpose is to provide a baseline against which the effectiveness of other alternatives can be evaluated. Exposed waste materials would remain in place under the no action alternative.

Alternative 2 - Capping, Roadway Separation, and ICs

Cost per 100 linear feet: $5,006
Estimated present worth cost: $40,063 - $150,188
Implementation time: 1 year

This remedial alternative consists of capping designated portions of railbed with large rock to prevent direct contact and reduce potential for erosion and transport of contaminated materials. Because the rail line is active, a rock cap is preferable to soil and vegetation for railroad maintenance concerns. Additionally, this alternative provides for a separation of the existing boundary of the railbed from residential areas, alleys and other roadways, as necessary, with a barrier to eliminate vehicular traffic on the beds and control surface runoff. Barriers include the use of retaining walls and/or curbing. Existing ICs would continue in the form of private property and government restrictions.

Alternative 3 - Excavation and Disposal of Contaminated Railbed Materials and ICs

Cost per 100 linear feet: $73,840
Estimated present worth cost: $738,375 - $2,215,125
Implementation time: 2 years

This alternative would consist of the total removal of contaminated railbed materials and disposal in an on-site repository. The railroad bed would then be reconstructed with clean fill, with the railroad tracks, ballast, etc., being replaced.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 300.430(e)(9) of the NCP requires that the agencies evaluate and compare the remedial cleanup alternatives based on the nine criteria listed below. The first two criteria, (1) overall protection of human health and the environment and (2) compliance with applicable or relevant and appropriate requirements (ARARs) in Appendix A, are threshold criteria that must be met for the Selected Remedy. The Selected Remedy must then represent the best balance of the remaining primary balancing and modifying criteria.

8.1 EVALUATION AND COMPARISON CRITERIA

8.1 THRESHOLD CRITERIA

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how potential risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or ICs.

2. Compliance with ARARs addresses whether or not a remedy will comply with identified federal and state environmental and siting laws and regulations.

8.1.2 PRIMARY BALANCING CRITERIA

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time.

4. Reduction of toxicity, mobility and volume through treatment refers to the degree that the remedy reduces toxicity, mobility, and volume of the contamination.

5. Short-term effectiveness addresses the period of time needed to complete the remedy and

any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to carry out a particular option.

7. Cost evaluates the estimated capital costs, operation and maintenance costs, and present worth costs of each alternative.

8.1.3 MODIFYING CRITERIA

8. State acceptance indicates whether the State (DEQ), based on its review of the information concurs with, or opposes, or has no comment on the preferred alternative.

9. Community acceptance is based on whether community concerns are addressed by the Selected Remedy and whether or not the community has a preference for a remedy.

8.2 EVALUATING THE RESIDENTIAL SOIL ALTERNATIVES

The following is a brief summary of the agencies' evaluation and comparison of residential soil alternatives. Additional details evaluating the alternatives is presented in the FS. This section evaluates the performance of the residential soil alternatives against the nine criteria discussed above, and compares it with the other possible options.

8.2.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This criterion is based on the level of protection of human health and the environment afforded by each alternative. All of the alternatives, with the exception of Alternative 1 (no action), are somewhat protective of human health and the environment. Although Alternative 2 is somewhat protective, it only relies on compliance with county regulations, does not reduce arsenic concentrations under existing barriers or where barriers do not currently exist. Thus, it is not fully protective of human health and the environment. In contrast, Alternatives 3 and 4 offer highly protective and irreversible remedies which would result in low residual concentrations of arsenic remaining in residential areas. Only Alternatives 3 and 4 are discussed further in this evaluation of alternatives.

The analysis of the other criteria indicate that Alternative 4 provides the greatest overall protection of human health with the greatest risk reduction (clean soil versus treat soil), as compared to Alternative 3. Alternative 4 best approaches EPA's risk point of departure at 1E-06 with the replacement of clean soil.

8.2.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

This criterion is based on compliance with chemical-, location-, and action-specific ARARs. Alternatives 3 and 4 both comply with or attain identified state and federal ARARs.

8.2.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

This criterion is based on the magnitude of residual risk and adequacy and reliability of controls. Alternatives 3 and 4 both employ permanent irreversible actions, resulting in lower arsenic concentrations remaining in the soil. However, Alternative 4 provides for the greatest reduction in residual concentrations through removal of contaminated soil and replacement with clean soil.

8.2.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

This criterion is based on the treatment process used, the amount of contamination destroyed or treated, the reduction of toxicity, mobility and treatment, the irreversible nature of treatment, the type and quantity of residuals remaining, and the statutory preference for treatment. Only Alternative 3 uses a treatment process. This treatment (tilling and soil amendments) is expected to reduce arsenic concentrations in the upper soil surface to below the final risk-based action level and immobilize the arsenic and other metals present in the soil.

8.2.5 SHORT-TERM EFFECTIVENESS

This criterion is based on the degree of community and worker protection offered, the potential environmental impacts of the remediation, and the time until the remedial action is completed. Alternatives 3 and 4 both involve activities that have the potential to increase short-term risks. Such risks may result from a potential to generate arsenic-laden dust, to leave soils exposed for short periods of time, and to increase traffic of heavy vehicles in a residential area. Of these two alternatives, Alternative 3 involves a slightly lesser level of short-term risk, as in-place treatment will take a shorter time to implement than excavation and soil replacement, and will involve smaller and fewer pieces of equipment. However, EPA believes that any short-term risks associated with Alternatives 3 and 4, although minimal, can be effectively managed through careful planning and implementation.

8.2.6 IMPLEMENTABILITY

This criterion is based on the ability to perform construction and implement administrative actions. Alternatives 3 and 4 involve administrative and construction activities that will require careful scheduling and coordination with the county and with homeowners, who would likely continue to occupy their homes during remediation. Implementation of Alternative 4 will require the import of soil cover, which would need to be identified during the design phases. Both Alternatives 3 and 4 would also require ICs to be implemented. All of these activities are readily implementable, and there is no real difference among the alternatives.

8.2.7 COST

Alternative 4 is slightly more expensive than Alternative 3.

8.2.8 STATE ACCEPTANCE

The State has been consulted throughout this process and concurs with the Selected Remedy.

8.2.9 COMMUNITY ACCEPTANCE

Public comment on the RI/FS and Proposed Plan was solicited during a formal public comment period extending from July 8 and August 9, 1996. Comments received from the community were generally in support of EPA's Preferred Alternative (Alternative 4). Comments from ARCO strongly favor Alternative 3.

8.2.10 SUMMARY

EPA has rated the relative performance of each alternative with respect to each criterion. Alternatives are rated to have an advantage (+) or disadvantage (-) when compared to other alternatives. A zero rating (0) is applied to an alternative having no distinct advantage or disadvantage over the other alternatives. The summary of EPA's rating of residential soil alternatives is shown in Table 12.

Of the residential soil alternatives presented in this ROD, only Alternatives 3 and 4 are fully protective of human health and the environment and thus, are discussed further in this section. Alternative 4 reduces soil residual soil arsenic concentrations to a greater degree than Alternative 3 (clean soil versus treated soil). Both Alternatives offer permanent and irreversible actions. Alternative 3 employs treatment while Alternative 4 does not. Both Alternatives are readily implementable, have similar short-term impacts, and are cost effective.

Both Alternatives would require invasive actions in residential yard areas. Alternative 4 would require additional action to bring in clean soil. Alternative 3 is estimated to cost less than Alternative 4, although cost differences are not considered significant. Sufficient uncertainty exists with Alternative 3 to require additional treatability testing to demonstrate cleanup effectiveness, cost, and implementability issues.

In comparing the relative performance of all criteria (Table 12), Alternative 4 has a slight advantage over Alternative 3. However, important differences, listed below, between the two alternatives have lead EPD and the State of Montana to strongly prefer Alternative 4.

- Alternative 4 provides the greatest level of protection and best approaches EPA's 1E-06 risk point of departure and the State of Montana's general goal of protection from environmental carcinogens at 1E-05. Note that although the relative performance rating for overall protection of human health and the environment was the same, the differences described above in regard to a threshold criteria can be significant.

- Alternative 4 utilizes a proven methodology. Although soil treatment under Alternative 3 has been demonstrated in reducing relatively high concentrations to moderate levels in large areas using large equipment, it has not been demonstrated to be effective for low concentrations, in confined areas using smaller equipment. Sufficient uncertainty exists with the implementability, effectiveness, and cost of Alternative 3.

- Cost differences between Alternative 4 and 3 are not significant in comparison to the benefits described above.

8.3 EVALUATING THE RAILROAD BED ALTERNATIVES

The following is a brief summary of the agencies' evaluation and comparison of railroad bed alternatives. Additional details evaluating the alternatives are presented in the FS. This section evaluates the performance of the railroad bed alternatives against the nine criteria, and compares it with the other possible options.

8.3.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This criterion is based on the level of protection of human health and the environment afforded by each alternative. Only Alternatives 2 and 3 are protective of human health and the environment, and are discussed further in evaluation of alternatives. Alternative 3 offers the highest degree of protection as all contaminated materials are removed. However, the analysis of the other criteria indicate that Alternative 2 also provides high overall protection of human health and the environment. Also, it is more protective in the short-term and is more easily implemented in a shorter time frame than Alternative 3.

8.3.2 COMPLIANCE WITH ARARs

This criterion is based on compliance with chemical-, location-, and action-specific ARARs. Alternatives 2 and 3 comply with or attain state and federal ARARs.

8.3.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

This criterion is based on the magnitude of residual risk and adequacy and reliability of controls needed to manage remaining contaminants. Alternatives 2 and 3 both reduce or control the risks from contaminated railroad bed material. Alternative 3 (complete removal) provides the greatest effectiveness and permanence, although Alternative 2 (rock cap) can reasonably offer long-term effectiveness as well. To ensure the integrity of the remedial solution, Alternative 2 will require controls for management of remaining materials (i.e., routine visual inspections).

8.3.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

This criterion is based on the treatment process used, the amount of contamination destroyed or treated, the reduction of toxicity, mobility, and volume, the irreversible nature of treatment, the type and quantity of residuals remaining, and the statutory preference for treatment. None of the alternatives provide treatment.

8.3.5 SHORT-TERM EFFECTIVENESS

This criterion is based on the degree of community and worker protection offered, the potential environmental impacts of the remediation, and the time until the remedial action is completed. Alternatives 2 and 3 both involve activities that have the potential to increase short-term risks. These risks may result from the potential to generate arsenic laden dust, increase traffic of heavy vehicles in a residential area, and possibly create train-related safety

hazards.

Of these Alternatives, the Alternative 2 involves a lower level of short-term risk, as capping and roadway separation will take less time to implement than excavation and removal, and it will involve smaller and fewer pieces of equipment. It will also have less potential for train-related safety hazards. However, EPA believes any short-term risks for either Alternative 2 or 3 can be effectively managed through careful planning and implementation.

8.3.6 IMPLEMENTABILITY

The criterion is based on the ability to perform construction and implement administrative actions. Both Alternatives 2 and 3 require construction activities, but Alternative 2 has a significantly lower level of activity, comparing placement of rock to total removal and reconstruction of the railroad bed. Removal and reconstruction would require additional time, and would be conducted around the schedule of the train.

8.3.7 COST

Alternative 2 is significantly less expensive than Alternative 3.

8.3.8 STATE ACCEPTANCE

DEQ has been consulted throughout this process and is in agreement with EPA on the evaluation and selection of Alternative 2 as the Selected Remedy.

8.3.9 COMMUNITY ACCEPTANCE

Public comment on the RI/FS and Proposed Plan was solicited during a formal public comment period extending from July 8 to August 9, 1996. Comments received from the community were generally in support of Alternative 2. Comments from ARCO also favored Alternative 2 over Alternative 3.

8.3.10 SUMMARY

EPA has rated the relative performance of each alternative with respect to each criterion. Alternatives are rated as having an advantage (+) or disadvantage (-) when compared to other alternatives. A zero rating (0) is applied to an alternative having no distinct advantage or disadvantage to the other alternatives. The summary of EPA's rating of railroad bed alternatives is shown in Table 13.

Of the railroad bed alternatives presented in this ROD, only Alternatives 2 and 3 are fully protective of human health and the environment and attain ARARs, and thus, are discussed further in this section. Alternative 3 has a distinct advantage in long-term effectiveness and permanence as compared to Alternative 2 (removal versus engineered cover). However, other balancing criteria distinctly favor Alternative 2. Alternative 2 would have significantly fewer short-term impacts and implementability issues, and less cost.

In comparing Alternative 2 to Alternative 3, the balancing criteria favor Alternative 2. In addition, because the railroad bed is under an active line, community interests also favor Alternative 2. The State of Montana has been consulted throughout the process and has concurred with Alternative 2 as the Selected Remedy.

9.0 SELECTED REMEDY

Based upon consideration of CERCLA requirements, the detailed analysis of alternatives, and public comments, EPA has determined that the Preferred Alternative as presented in the Proposed Plan, with important modifications, is the appropriate remedy for the Community Soils OU. Modifications include specifying commercial/industrial soils for remediation in addition to residential soils and railroad bed materials, as presented in the Proposed Plan. This Selected Remedy will reduce risk to human health through the following:

- Reduction of surface soil arsenic concentrations to acceptable levels, and

- Prevention of direct human contact with waste materials (i.e., railroad beds).

While certain other alternatives may better satisfy individual selection criteria, the Selected Remedy best meet the entire range of selection criteria and achieves, in EPA's determination, the appropriate balance considering site-specific conditions and criteria identified in CERCLA and the NCP, as provided in Section 10.0, Statutory Determinations.

9.1 REMEDY FOR RESIDENTIAL SOILS

The Selected Remedy will address all remaining residential soils within the site, through the following:

1. Clean up all current residential soils within the Anaconda Smelter NPL Site that exceed the residential action level of 250 ppm soil arsenic concentration, through removal and replacement with clean soil and a vegetative (e.g., new sod or seed) or other protective barrier (e.g., asphalt pavement, concrete sidewalks).

   - Residential soils include yards, parks, school grounds, or other play areas. Also included are barren driveways, alleys, or other common areas adjacent to yards which may contribute to the contamination of yards and which may be frequented by children.

   - Based on soils characterization in the RI/FS report, all current and reasonably anticipated future residential areas within the Anaconda Smelter NPL Site that are estimated to exceed 250 ppm soil arsenic concentration, have been identified as the "Focus Area" for cleanup (Figure 4 and Exhibit 1).

   - The cleanup activities will be directed toward or initiated in residential areas that are within the Focus Area.

   - The cleanup activities will provide for opportunistic sampling and remediation of potentially contaminated soils outside the Focus Area (i.e., individual areas that exceed 250 ppm soil arsenic concentration, or areas suspected of having contaminated material present from the railroad bed or other sources) on a limited basis.

   - Residential soils to be cleaned up (those that exceed 250 ppm soil arsenic concentration) will be determined by sampling. Consideration will also be given to the permanence of existing barriers and ICs (e.g., use restrictions, maintenance, etc.) in determining which residential soils will be remediated.

   - In areas where soil removal is to be implemented, only the depth of soil that is greater than 250 ppm soil arsenic concentration, to a maximum of 18 inches, will be removed (Figure 8). The maximum 18-inch depth is based upon possible activities that might be conducted in a yard (i.e., garden, play area, ot other excavation).

   - In areas where site-specific conditions dictate that removal is not implementable (i.e., yard size, topography, rocks, trees, etc.), other measures (i.e., capping, tilling, ICs,, etc.) will be taken to reduce arsenic concentrations to below the 250 ppm action level or prevent exposure.

   - Removed soils will be disposed of in a designated on-site soil management area.

2. Implement ICs to clean up future residential areas.

   - Clean up all future residential soil areas within the Focus Area that exceed the residential action level of 250 ppm soil arsenic concentration at the time of development, through the ADLC-DPS. The ADLC-DPS will continue to require soil sampling at all new residential construction within the Superfund Planning Area Overlay District. Soils exceeding the 250 ppm soil arsenic concentration will be cleaned up through the DPS with preference given to removal.

- The current ADLC Superfund Planning Area Overlay District will be expanded, where necessary, to include the Focus Area.

- In areas where site-specific conditions dictate that removal is not implementable, other measures (i.e., capping, tilling, ICs, etc.) will be taken to reduce arsenic concentrations to below the 250 ppm action level or prevent exposure.

3. Implement ICs to provide educational information to all residents describing potential risks and recommendations to reduce exposure to remaining contaminated soils.

- Developed a CPMP, to be managed by ADLC, to provide educational information to residents within the ADLC Superfund Planning Overlay District describing risks and recommendations to reduce exposure to residual contaminants (>250 ppm) in soils (i.e., the importance of maintaining a healthy lawn or other protective cover).

- Information on soil arsenic concentrations and locations will be maintained in an ADLC database for public access. All sampling results and pertinent changes in soils and conditions of existing covers will be recorded for use by regulators, prospective home buyers, lenders, contractors, and other interested parties.

4. Institutional operation and maintenance activities as necessary.

9.2 REMEDY FOR COMMERCIAL/INDUSTRIAL AREAS

Consistent with the remedial action selected for the OW/EADA, the selected remedy will address remaining commercial/industrial areas within the Anaconda Smelter NPL Site through the following:

1. Reduce arsenic concentrations at the surface to below 500 ppm in current industrial or commercial areas using a combination of Resentation techniques and/or engineered covers.

- Utilize Revegetation techniques, which may include deep tilling, lime additions, and soil amendments, to reduce surface soil arsenic concentrations to below 500 ppm and establish a diverse, effective, and permanent vegetative cover.

- Construct engineered covers to provide an effective and permanent barrier to waste materials.

2. Implement ICs to clean up future commercial/industrial areas.

- Final remediation of arsenic contamination in commercial/industrial areas to the action level of 500 ppm will be implemented through the ADLC-DPS at the time development occurs, except as otherwise determined by EPA, in consultation with the affected landowner.

3. Institute operation and maintenance activities as necessary.

9.3 REMEDY FOR RAILROAD BED MATERIALS

The Selected Remedy will address contaminated railroad beds within the Community of Anaconda (Figure 4) through the following:

1. Construct an engineered cover over all contaminated railroad bed material within the community of Anaconda to prevent direct contact with, and reduce potential for erosion and transport of, contaminated materials to residential areas.

- Utilize large rock on portions of the railroad bed that have steeper fill slopes (Figure 9).

- Utilize clean ballast material on portions of the railroad bed strictly used for

railroad operation.

2. Separate the existing boundary of the railbed from residential areas with a barrier to restrict access to the railbed and to control surface runoff from the railbed through the use of retaining walls and/or curbing.

3. Maintain existing ICs to restrict access (i.e., governmental and private trespass regulations).

4. Institute operation and maintenance activities as necessary.

9.4 CLEANUP LEVELS

The purpose of this response action is to control risks posed by direct contact with all residential soils and waste materials (i.e., railroad beds) within community areas of the Anaconda Smelter NPL Site. Although the results of the risk assessment indicate that risks calculated for each subarea are all within EPA's targeted risk range, individual yards within a subarea having elevated concentrations of arsenic (i.e., hot spots) could preferentially pose an unacceptable risk to those residents. In addition, rural residential areas that were not adequately sampled to allow a calculation of risk, may also have hot spots that could pose an unacceptable risk. Thus, EPA believes a remedial action is necessary to address those individual residential areas or hot spots within the Community Soils OU.

Since no federal or state ARARs exist for soil arsenic or waste material, an action level was determined through site-specific analysis. The analysis used the Final Baseline HHRA (CDM Federal 1996a) to develop a range of screening levels that corresponded to risks within EPA's target risk range of 1E-04 to 1E-06. The action level for residential soils is 250 ppm soil arsenic concentration. This corresponds to an excess cancer risk of 8E-05 and is within EPA's targeted risk range.

All residential soils in excess of the action level will be addressed by the Selected Remedy. In individual yards where the Selected Remedy is implemented, the cleanup level is expected to approach 1E-05 with the replacement of clean soil. In addition, cleaning up individual yards in excess of the 250 ppm action level is expected to reduce the overall risk in each subarea and the entire community of Anaconda to close to 1E-05 which approaches EPA's 1E-06 point of departure and the State of Montana's general goal of protection from environmental carcinogens at 1E-05.

The action level for commercial/industrial soils is 500 ppm soil arsenic concentration. This corresponds to an excess cancer risk of approximately 6E-05 and is within EPA's targeted risk range. This action level is a continued application of the commercial/industrial action level established under the OW/EADA ROD (EPA 1994a). Although no areas were identified in the RI/FS, both current and future properties may be identified during Remedial Design. Commercial/Industrial areas where the Selected Remedy is implemented, the cleanup level at the surface is expected to approach 1e-05 through the use of engineered cover.

No action level was developed for addressing the railroad bed materials within the community of Anaconda. Concentrations of arsenic throughout the profile of the railbed material generally exceed 1000 ppm. Because the railbed material is located within the community of Anaconda, the above action levels of 250 and 500 ppm for residential and commercial/industrial areas, respectively, are applied to the railbed material. Where the Selected Remedy is implemented to railbed material, the cleanup level at the surface is expected to approach 1E-05 through the use of engineered covers.

9.5 REMEDIATION REQUIREMENTS

The remediation requirement for residential soils is to reduce surface arsenic concentrations to below 250 ppm. The remediation requirement for contaminated railroad bed materials is to prevent direct contact with, and reduce potential for erosion and transport of, contaminated material to residential areas. The specific remediation requirements of the Selected Remedy are to:

! Reduce soil arsenic concentrations in residential areas to below 250 ppm through removal

and replacement with clean soil and a vegetative or other protective barrier.

- Current residential areas with soils exceeding 250 ppm soil arsenic concentration shall be identified through sampling during Remedial Design. Existing barriers and ICs (e.g., use restrictions, maintenance, etc.,) will also be evaluated to identify soils requiring remediation.

- All identified residential soils exceeding 250 ppm soil arsenic concentration shall be removed to a maximum depth of 18 inches.

- Clean soil, as determined by EPA, shall be used to replace removed soils. Soils shall be of sufficient quality to support a vegetative or other protective barrier.

- Protective barriers shall be designed to protect the replaced soils and/or provide an effective and permanent barrier to contaminated soils or waste materials.

- Vegetative barriers shall be of sod or seed in consideration of land use.

- Removed soils shall be disposed of in a protective manner.

! Reduce arsenic concentrations at the surface to below 500 ppm in current industrial or commercial areas using a combination of Revegetative techniques and/or engineered covers.

- Resentation techniques, which may include deep tilling, lime additions, or soil amendments, shall be implemented to reduce surface soil arsenic concentrations to below 500 ppm and establish a diverse, effective, and permanent vegetative cover.

- Engineered covers shall be designed to provide an effective and permanent barrier to waste materials. Soil covers shall be stabilized with Resentation that provided a diverse, effective, and permanent cover.

! Develop ICs to restrict and manage future land use.

- Assure that future land use at the site is consistent with EPA's determination of the health and environmental risks posed by contaminants left on site.

- Provide for the preservation and maintenance of Superfund remedial structures on the site, including but not limited to caps, beams, waste repositories, and vegetated areas.

_ Require that future development at the site employ construction practices that are consistent with the Protection of public health and the environment, as determined by Superfund remedial actions.

- Remedied, as development occurs at the site, soil arsenic contamination to levels appropriate for the intended use, as determined by Superfund remedial actions.

- Provide for implementation of other laws applicable to development, such as subdivision and floodplain requirements.

! Design engineered covers to prevent direct contact with, and reduce potential for erosion and transport of, contaminated railroad bed materials.

- Engineered covers shall be designed to provide an effective and permanent barrier to waste materials.

! Design engineered barriers to restrict access to railroad bed and to control surface runoff.

- Barriers shall be designed to prevent contaminated railbed material from eroding to adjacent residential areas.

9.6 COST

Unit cost for addressing residential soils and railroad bed materials are presented in Table 14. Based on the information presented in the RI/FS, Proposed Plan, and this ROD, and specifically for the purpose of estimating the total present worth cost of this Selected Remedy, the following RI/FS unit assumptions have been revised as follows:

Estimated number of yards to be remediated - 50

Estimated linear feet of railroad bed to be remediated - 10,000 feet

The total present worth cost of the Selected Remedy in the Community Soils OU is estimated $2.3 million (Table 14).

9.7 CONTINGENCY MEASURES

In the event ICs (i.e., the ADLC-DPS and CPMP) fail to identify and remedied remaining residential and commercial/industrial areas in excess of the action level, and protect and monitor the implemented remedy, additional measures will be taken by EPA. Because waste materials will remain on site, the remedy may take several years to implement, and will require long-term ICs, the Selected Remedy will require a five-year review under section 121(c of CERCLA and Section 300.430(f)(4)(II) of the NCP.

Removal of soils and covering of waste materials is fully expected to meet cleanup levels. However, if the remedial design or action phase indicates that the levels will not be met, additional measures will be taken as necessary to meet the cleanup requirements.

10.0 STATUTORY DETERMINATIONS

Under CERCLA Section 121, EPA must select a remedy that is protective of human health and the environment, that complies with ARARs, is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that include treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the Selected Remedy meets these statutory requirements.

10.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The Selected Remedy protects human health and the environment through the prevention of direct contact with contaminants at the site. The Selected Remedy balances the use of removal, engineered covers, and ICs to effectively reduce direct contact, ingestion, and inhalation of all contaminants, but particularly arsenic, to reduce risks in the area of 1E-05. This is within EPA's targeted risk range of 1E-04 to 1E-06 and approaches EPA's 1E-06 point of departure and the State of Montana's general goal of protection from environmental carcinogens at 1E-05.

All residential soils in excess of the action level will be addressed by the Selected Remedy. In individual yards where the Selected Remedy is implemented, the cleanup level is expected to approach 1E-05 with the replacement of clean soil. In addition, cleaning up individual yards in excess of the 250 ppm action level is expected to reduce the overall risk in each subarea and the entire community of Anaconda to close to 1E-05.

The action level for commercial/industrial soils is 500 ppm soil arsenic concentration. This corresponds to an excess cancer risk of approximately 6E-05 and is within EPA's targeted risk range. This action level is a continued application of the commercial/industrial action level established under the OW/EADA ROD (EPA 1994a). Commercial/industrial areas where the Selected Remedy is implemented, the cleanup level at the surface is expected to approach 1E-05 through the use of engineered covers.

Because the railbed material is located within the community of Anaconda, the above action levels of 250 and 500 ppm for residential and commercial/industrial areas respectively, are applied to the railbed material. Where the Selected Remedy is implemented to railbed material, the cleanup level at the surface is expected to approach 1E-05 through the use of engineered covers.

Environmental risk will be further reduced through removal of soils and use of engineered covers to minimize the transport of contaminants to other media (i.e., air, surface and groundwater).

There are no short-term threats associated with the Selected Remedy that cannot be readily controlled through applicable health and safety requirements, monitoring, and standard construction practices.

10.2 COMPLIANCE WITH ARARs

The Selected Remedy will comply with all ARARs identified in Appendix A to this ROD. No waiver of ARARs is expected to be necessary. Final Performance Standards and compliance points will be determined in Remedial Design.

10.3 COST EFFECTIVENESS

EPA has determined that the Selected Remedy is cost effective in mitigating the principal risks posed by contaminated wastes and soils. Section 300.430(f)(ii)(D) of the NCP requires evaluation of cost effectiveness. Overall effectiveness is determined by the following three balancing criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost effective. The Selected Remedy meets the criteria and provides for overall effectiveness in proportion to its cost. The estimated cost for the Selected Remedy is $2.3 million.

To the extent that the estimated cost of the Selected Remedy exceed the cost for other alternatives, the difference in cost is reasonable when related to the greater overall effectiveness achieved by the Selected Remedy.

10.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES (OR RESOURCE RECOVERY TECHNOLOGIES) TO THE MAXIMUM EXTENT POSSIBLE

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost effective manner at the Community Soils OU.

Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy for residential and commercial/industrial soils and railroad bed materials provides the best balance of trade-offs in terms of long-term effectiveness and permanence, treatment, implementability, cost, and state of community acceptance.

While the Selected Remedy for residential soils does not employ treatment, the removal of contaminated soils and replacement with clean soil provides greater protection by reducing soil arsenic concentrations, and, therefore, risk, to a greater extent. This Selected Remedy utilizes proven methodologies in removing and replacement of soils and is consistent with previous residential soil removal actions taken at the site (i.e., Community Soils TCRA).

While the Selected Remedy for the railroad beds does not utilize the most permanent solution (removal), the use of engineered covers provides a long-term effective and permanent barrier to contaminated waste materials, thus reducing risk to an equivalent extent. Additional barriers and surface controls will prevent the migration of contaminants to adjacent residential areas. Ics, including maintenance activities, will be coordinated through local government to ensure long-term effectiveness of the remedy. This Selected Remedy achieves equivalent risk reduction with significantly fewer short-term impacts, implementability issues, and cost. This Selected Remedy also allows for continued operation of the active railway and is consistent with remedial actions taken at the site on similar wastes (i.e., OW/EADA OU).

The selected Remedy for commercial/industrial areas utilizes a combination of engineered covers and Revegetation techniques that have been demonstrated to be long-term effective and permanent, implementable, and cost effective at other remedial actions taken at the site on similar waste materials (i.e., OW/EADA OU). This Selected Remedy will also utilize innovative treatment techniques as applicable.

Any short-term impacts associated with the Selected Remedy can be effectively managed through careful planning and implementation.

10.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

Treatment of residential soils was considered but was determined to be not as protective and permanent as the Selected Remedy (removal). Treatment of the railroad bed materials was not considered due to the fact that the rail line is active and that the railbed would need to retained or replaced. In addition, treatment has been employed in previous response actions to address principal treat wastes at the Anaconda Smelter NPL Site.

11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The RI/FS and Proposed Plan were released for public comments in July 1995. Because data contained in the RI did not identify commercial/industrial areas of concern, the FS and Proposed

Plan did not specifically identify alternatives for addressing those areas within the site. Arsenic concentrations from the commercial/industrial areas previously sampled were below risk-based screening levels. However, during the public comment period, concerns were expressed regarding specific commercial/industrial areas that have not been sampled.

Since the Selected Remedy will address commercial/industrial properties associated with certain residential soils or properties containing railroad bed materials, and since most commercial/industrial areas at the site are currently addressed under the OW/EADA ROD (EPA 1994a), EPA has determined that it is appropriate to formally address all remaining current and future commercial/industrial land use areas at the Anaconda Smelter NPL Site under this Selected Remedy. Although commercial/industrial areas were not specifically evaluated in the FS, sufficient information exists to include them in the Selected Remedy. EPA has determined that the inclusion of these commercial/industrial areas in this ROD is a logical outgrowth of the information available to the public in the RI/FS and Proposed Plan. As discussed in this ROD, EPA will address these areas in the same manner that other commercial/industrial areas are currently being addressed at the site. Components of both the Community Soils and OW/EADA Selected Remedy (engineered covers, soil treatment, and ICs) will also apply to the remaining commercial/industrial areas. This includes the selected 500 ppm soil arsenic cleanup level. This approach is consistent with the final cleanup strategy for the site.

12.0 REFERENCES

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Peccia & Associates. 1992. Anaconda Deer Lodge County Comprehensive Master Plan, prepared for the Anaconda-Deer Lodge County Planning Board by Peccia & Associates and Lisa Bay Consulting. December 1990. Revised June 1992.

TABLE 1

Anaconda Smelter NPL Site Previous Investigations and Reports
Used in Community Soils RI Report

Year	Description
1985	Soils Data Report, Phase II, ARCO.
1986	Anaconda Smelter RI/FS, Phase I, Data Compilation, ARCO.
1987	Solid Matrix Screening Study, Anaconda Smelter NPL Site, EPA.
1988	Community Soils Screening Study, EPA.
1991	Anaconda Soil Investigation, Phase I, ARCO.
1991	Smelter Hill RI/FS, Phase I and II Soil Investigations, ARCO.
1991	Anaconda Community Soils Economic Evaluation/Cost Analysis, ARCO.
1992	Old Works/East Anaconda Development Area RI/FS, ARCO
1993	Anaconda Soil Investigation, Phase II, ARCO.
1993	Anaconda Regional Water and Waste Quarterly Sampling, ARCO.
1993	Smelter Hill RI/FS, Phase II, ARCO.
1994	The "Department of Justice Study", Anaconda Smelter NPL Site, U.S. Department of Justice.
1994	Anaconda Arsenic Exposure Study, ARCO.
1994	Aspen Hills subdivision soil sampling, local developer.
1995	Terrestrial Resources Injury Assessment Report, Upper Clark Fork River Basin, State of Montana.
1995	Regional Water and Waste RI Report, ARCO.
1996	Baseline Human Health Risk Assessment, EPA.

TABLE 2

Summary of Kriging Results - Community and Regional

Sample location	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	pH
Community Surface Soil Samples						
Anaconda						
(551 grid cells)						
Minimum	72	1.4	-	111	-	-
Maximum	514	16.0	-	698	-	-
Average	186	5.9	-	328	-	-
Opportunity						
(360 grid cells)						
Minimum	98	4.0	-	101	-	-
Maximum	230	8.5	-	238	-	-
Average	154	5.6	-	153	-	-
Regional Surface Soil Samples						
(3,033 grid cells)						
Minimum	29	0.1	0.5	16	63	3.8
Maximum	1,856	41.0	5,287	825	1,932	8.9
Average	195	4.5	435	127	300	6.5

- = Kriging not conducted for this parameter on the Community data
mg/kg = milligrams per kilogram

TABLE 3

Summary of Subsurface Soil Sampling - Community and Regional

Sample location	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	pH
Community Surface Soil Samples						
Anaconda						
(2 to 10 inches), 41 samples						
Minimum	16	0.6	75	9	55	6.3
Maximum	326	9.6	3,860	390	1,030	8.2
Average	140	2.7	688	111	290	7.4
(10 to 24, 26 to 36, and 36 to 48 inches), 27 samples						
Minimum	7	0.6	16	8	42	7
Maximum	700	8.8	3,140	673	687	8.8
Average	111	1.7	612	90	163	7.6
Opportunity						
(2 to 10 inches), 16 samples						
Minimum	18	0.7	31	9	44	6.4
Maximum	125	2.3	300	63	172	8.3
Average	71	1.5	179	40	117	7.4
(10 to 24 inches), 9 samples						
Minimum	2	1.5	7	8	28	6.7
Maximum	295	1.5	139	39	121	7.6
Average	52	1.5	31	13	47	7.1
Regional Surface Soil Samples						
(2 to 10 inches and 3 to 6 inches), 388 samples						
Minimum	2	0.2	6	6	28	2.9
Maximum	2,440	126	18,133	1,550	3,500	8.7
Average	237	5	509	88	339	6.6
(10 to 25 inches and deeper), 198 samples						
Minimum	1	0.2	4	4	18	3.5
Maximum	1,250	32.0	7,590	587	3,850	9.1
Average	145	2.0	299	32	242	7.3

mg/kg = milligrams per kilogram

TABLE 4

Summary of Railroad Bed Sampling - Anaconda and Regional

Sample Location	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc	pH
Anaconda Surface Soil Samples						
Surface Interval (0 to 2 inches), 29 samples						
Maximum	3,780	101.0	139,000	2,760	23,000	7.5
Minimum	213	3.0	1,200	152	1,010	2.6
Average	1,285	22.3	11,482	959	5,846	6.0
Subsurface Intervals (2 to 10 inches), 25 samples						
Maximum	12,200	114.0	15,200	3,700	35,500	7.5
Minimum	45	3.0	370	32	75	2.6
Average	1,389	9.0	5,604	681	4,830	5.7
Subsurface Intervals (10 to 24 inches), 25 samples						
Maximum	3,410	40.0	10,700	1,230	11,300	7.6
Minimum	6	3.0	61	12	74	2.8
Average	831	5.2	2,800	365	2,029	5.1
Regional Railroad Bed Samples						
Surface Interval (0 to 2 inches), 249 samples						
Maximum	66,900	---	79,100	13,800	60,600	8.9
Minimum	86	---	93	122	484	2.2
Average	2,140	---	4,607	786	5,185	6.5
Subsurface Interval (2 to 10 inches), 22 samples						
Maximum	10,100	---	7,660	5,520	16,000	8.6
Minimum	261	---	247	122	647	3.4
Average	2,711	---	3,470	1,165	4,489	6.2
Subsurface Interval (10 to 24 inches), 26 samples						
Maximum	5,260	---	19,000	3,850	16,900	8.3
Minimum	96	---	142	122	647	4.1
Average	1,441	---	2,714	548	3,640	6.1

mg/kg = milligrams per kilogram

Note: Regional railroad beds were not sampled for cadmium.

TABLE 5

Exposure Parameters for the Residential Scenario

Symbol	Units	Definition	Value		Source
SL	(mg arsenic/kg soil)	risk based screening level	Section 6-2	-	
TR	(unitless)	target risk	Section 6-2	-	
AT	(days)	averaging time	Carcinogens=25,550	Noncarcinogens	
			RME=10,950	EPA 1989a	
			CTE=3,285		
CF	(mg/kg)	conversion factor	.000001	EPA 1989a	
EF	(days/year)	exposure frequency	350	EPA 1989a	
SF0	(mg/kg-day)-1	oral slope factor for arsenic	1.5	EPA 1995b	
IRchild	(mg/day)	soil ingestion rate for children	RME=200	EPA 1993a	
			CTE-100	EPA 1993a	
EDchild	(years)	exposure duration for children	RME=6	EPA 1993a	
			CTE=2	EPA 1993a	
BWchild	(kg)	average body weight for children	15	EPA 1989a	
IRadult	(mg/day)	soil ingestion rate for adults	RME=100	EPA 1993a	
			CTE=50	EPA 1993a	
EDadult	(years)	exposure duration for adults	RME=24	EPA 1993a	
			CTE=7	EPA 1993a	
BWadult	(kg)	average body weight for adults	70	EPA 1989a	
FS	(unitless)	fraction of soil ingested	0.45	Professional Judgement	
BAFs	(unitless)	bioavailability of soil	0.183	EPA 1995a	
C	(unitless)	contribution of soil arsenic to arsenic in dust	0.43	Calculated, see text	
FD	(unitless)	fraction of dust ingested	0.55	Professional Judgement	
BAFd	(unitless)	bioavailability of interior dust	0.258	EPA 1995a	

Source: Final Baseline Human Health Risk Assessment, CDM Federal 1996
mg/kg=milligrams per kilogram
RME=Reasonable Maximum Exposure
CTE=Central Tendency Exposure

TABLE 6

Arsenic Exposure Point Concentrations for Soils (mg/kg)

Subarea	Sample Number	Geometric Mean	Arithmetic Mean	Ln-STD	Minimum Detection	Maximum Detection	95th UCL	
Subarea A	44	82.27	86.92	0.34	38.40	171.20	95.76	
Subarea B	60	130.84	138.97	0.35	59.33	229.80	150.52	
Subarea C	17	183.46	191.43	0.30	107.50	306.33	221.65	
Subarea D	11	214.86	225.26	0.34	136.00	340.00	282.23	
Subarea E	47	190.57	195.31	0.22	92.00	292.50	206.31	
Subarea F1	52	237.46	246.36	0.28	126.50	409.25	264.60	
Subarea F2	36	190.67	204.30	0.39	82.50	373.50	231.64	
Subarea I*	3	109.73	117.13	0.45	67.50	165.50	830.01	
Subarea J	10	132.95	140.66	0.36	64.00	193.60	181.24	
Opportunity	22	122.73	127.56	0.30	128.90	219.25	145.05	

*Area I should use maximum detection because of limited sample number (3)
Source: Final Baseline Human Health Risk Assessment, CDM Federal 1996a
mg/kg=milligrams per kilogram

TABLE 7

Summary of Soil Lead Data

Subarea	Number of Residences	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Average Concentration (mg/kg)	Standard Deviation
Subarea A	44	19.80	312.00	75.92	54.42
Subarea B	60	44.60	1,183.00	256.65	215.04
Subarea C	17	57.20	851.00	476.49	245.23
Subarea D	11	110.20	812.50	419.37	230.53
Subarea E	47	110.00	1,388.00	581.66	292.04
Subarea F1	52	111.00	2,152.70	533.99	302.75
Subarea F2	36	60.00	1,220.20	508.14	288.65
Subarea I	3	60.50	87.00	75.03	13.44
Subarea J	10	14.30	303.20	191.20	88.43
Opportunity	22	46.20	351.20	133.98	81.85
All Areas	302	14.30	2,152.70	364.03	297.24

Source: Final Baseline Human Health Risk Assessment, CDM Federal 1996a
mg/kg=milligrams per kilogram

TABLE 8

Noncancer Risks
Ingestion of Arsenic in Groundwater, Soil, and Dust
RME and CTE Residential Scenario, Anaconda Smelter NPL Site
(mg/kg-day)

	RME Scenario			CTE Scenario		
Subarea	Groundwater Ingestion HQ	Soil and Dust Ingestion HQ	Total Arsenic Risk	Groundwater Ingestion HQ	Soil and Dust Ingestion HQ	Total Arsenic Risk
Subarea A	3.27E-01	2.11E-01	5.48E-01	1.34E-01	1.13E-01	2.46E-01
Subarea B	*	2.79E-01	2.79E-01	*	1.49E-10	1.49E-01
Subarea C	*	3.60E-01	3.60E-01	*	1.93E-01	1.93E-01
Subarea D	*	5.70E-01	5.70E-01	*	3.05E-01	3.05E-01
Subarea E	*	3.80E-01	3.80E-01	*	2.03E-01	3.03E-01
Subarea F1	*	5.24E-01	5.24E-01	*	2.80E-01	2.80E-01
Subarea F2	*	4.48E-01	4.48E-01	*	2.40E-01	2.40E-01
Subarea I	*	3.45E-01	3.45E-01	*	1.84E-01	1.84E-01
Subarea J	*	3.32E-01	3.32E-01	*	1.77E-01	1.77E-01
Opportunity	2.83E-01	3.20E-01	6.03E-01	1.12E-01	1.71E-01	2.83E-01

*Groundwater risks were not evaluated for these subareas since the primary source of drinking water is the public water supply.
Source: Final Baseline Human Health Risk Assessment, CDM Federal 1996a
mg/kg=milligrams per kilogram
HQ=hazard Quotient
RME=Reasonable Maximum Exposure
CTE=Central Tendency Exposure

TABLE 9

IEUBK Modeling Results Summary

Subarea	Predicted Percentage of Individuals with Blood Level Levels Above 10 :g/dL	Predicted Geometric Mean Blood Lead Level (:g/dL)
Subarea A	0.00	2.3
Subarea B	0.13	3.7
Subarea C	2.23	5.2
Subarea D	1.32	4.8
Subarea E	5.38	5.9
Subarea F1	3.74	5.5
Subarea F2	3.00	5.4
Subarea I	0.00	2.3
Subarea J	0.03	3.2
Opportunity	0.01	2.8
All Areas	0.68	4.4

Source: Final Baseline Human Health Risk Assessment, CDM Federal 1996a
:g/dL=micrograms per deciliter

TABLE 10

Cancer Risks
Ingestion of Arsenic in Groundwater, Soil, and Dust
RME and CTE Residential Scenario, Anaconda Smelter NPL Site
(mg/kg-day)

	RME Scenario				CTE Scenario		
Subarea	Groundwater Ingestion HQ	Soil and Dust Ingestion HQ	Total Arsenic Risk	Total Risk HQ	Groundwater Ingestion	Soil and Dust Ingestion HQ	Total Arsenic Risk
Subarea A	3.76E-05	1.55E-05	5.30E-01	3.94E-06	2.44E-06	6.38E-06	
Subarea B	*	2.05E-05	2.05E-05	*	3.23E-06	3.23E-06	
Subarea C	*	2.64E-05	2.64E-05	*	4.17E-06	4.17E-06	
Subarea D	*	4.18E-05	4.18E-05	*	6.59E-06	6.59E-06	
Subarea E	*	2.79E-05	2.79E-05	*	4.40E-06	4.40E-06	
Subarea F1	*	3.84E-05	3.84E-05	*	6.06E-06	6.06E-06	
Subarea F2	*	3.29E-05	3.29E-05	*	5.19E-06	5.19E-06	
Subarea I	*	2.53E-05	2.53E-05	*	3.98E-06	3.98E-06	
Subarea J	*	2.43E-05	2.43E-05	*	3.83E-06	3.83E-06	
Opportunity	3.16E-05	2.34E-05	5.51E-05	3.32E-06	3.69E-06	7.01E-06	

*Groundwater risks were not evaluated for these subareas since there was inadequate data from these subareas.
Source: Final Baseline Human Health Risk Assessment, CDM Federal 199a
mg/kg=milligrams per kilogram
HQ=hazard Quotient
RME=Reasonable Maximum Exposure
CTE=Central Tendency Exposure

Record of Decision
Community Soils OU
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TABLE 11

Risk-Based Screening Levels for Arsenic for the Anaconda Smelter NPL Site

Medium	Soil								Surface Water	
Screening Level Based on Carcinogenic Risk	Residential Scenario (mg/kg)		Agricultural Scenario (mg/kg)		Commercial Worker Scenario (mg/kg)		Recreational Biker Scenario (mg/kg)		Dirt Recreational Youth/Swimmer Scenario (mg/L)	
	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE
1E-07	0.30	1.85	1.00	10.04	1.33	10.15	2.32	53.55	0.002	0.008
1E-06	2.97	18.5	10.03	100.4	13.3	101.5	23.2	535.5	0.020	0.81
1E-05	29.7	185.2	100.3	1,003	133	1,015	232.3	5,355	0.20	0.81
1E-04	297	1,852	1,003	10,038	1,331	10,155	2,323	53,551	2.0	8.1
1E-03	2,970	18,515	10,033	100,358	13,307	101,546	23,231	535,517	20.2	81.0
Screening Level Based on Noncarcinogenic Effects (HQ=1)	573	1,071	NC	NC	2,139		4,570	NC	NC	1.04	4.16

NC=Not calculated. Risk-based screening levels for these exposure scenarios are based on inhalation and ingestion exposures. A RfD for inhalation is not available; screening levels based on noncarcinogenic effects can, therefore, not be calculated for these exposure scenarios.

Source: Final Baseline Human Health Risk Assessment, CDM Federal 1996a

mg/kg=milligrams per kilogram

mg/L=milligrams per liter

HQ=Hazard Quotient

RME=Reasonable Maximum Exposure

CTE=Central Tendency Exposure

TABLE 12

Comparison of Remedial Alternatives for Residential Soils

NCP Criteria	Alternative 1 No Action	Alternative 2 ICs	Alternative 3 In-Place treatment, Capping, and ICs	Alternative 4 Excavation, Disposal and ICs
Threshold Criteria				
Overall Protection of Human Health and the Environment	-	-	+	+
Compliance with ARARs	+	+	+	+
Balancing Criteria				
Long-term Effectiveness and Permanence	NR	NR	+	+
Reduction of Toxicity, Mobility, or Volume through Treatment	NR	NR	+	0
Short-term Effectiveness	NR	NR	0	0
Implementability	NR	NR	0	0
Cost	NR	NR	0	0
Modifying Criteria				
State Acceptance	NR	NR	-	-
Community Acceptance	NR	NR	0	0
Net Rating	NR	NR	3+	4+

A rating of - to + is given if the alternative addresses the criteria, with - being the lowest rating and + being the highest.
A "0" signifies no significant advantage or disadvantage.
The Selected Remedy must meet the threshold criteria.
NR = Not Rated; did not meet the threshold criteria.

TABLE 13

Comparison of Remedial Alternatives for Railroad beds

NCP Criteria	Alternative 1 No Action	Alternative 2 Capping, Roadway Separation, and ICs	Alternative 3 ICs and Excavation, and Disposal
Threshold Criteria			
Overall Protection of Human Health and the Environment	-	+	+
Compliance with ARARs	-	+	+
Balancing Criteria			
Long-term Effectiveness and Permanence	NR	0	+
Reduction of Toxicity, Mobility, or Volume through Treatment	NR	0	0
Short-term Effectiveness	NR	0	-
Implementability	NR	0	-
Cost	NR	0	-
Modifying Criteria			
State Acceptance	NR	0	0
Community Acceptance	NR	+	0
Net Rating	NR	3	0

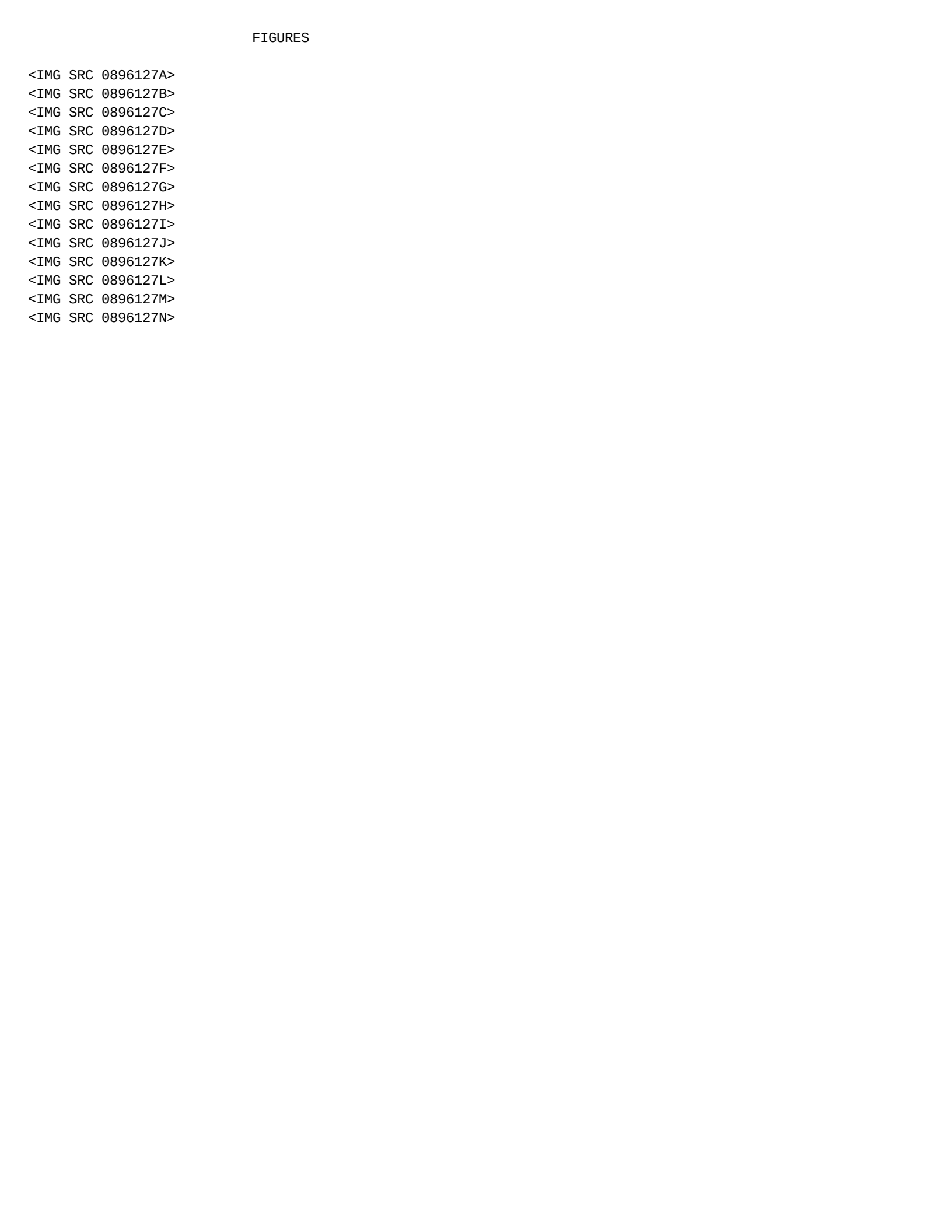
A rating of - to + is given if the alternative addresses the criteria, with - being the lowest rating and + being the highest.
A "0" signifies no significant
advantage or disadvantage.
The Selected Remedy must meet the threshold criteria.
NR = Not Rated; did not meet the threshold criteria.

TABLE 14

Capital Costs

Residential Soil Component (50 residential yards			Cost
Excavation and Disposal Soils			
Excavation and Transport of yard soils($1,700/res. yard)			85,000
Site Preparation (1,500/res. yard)			75,000
Eco-Compost ($25/cu. yd.) (2.3 cu. yd./res. yard)			2,875
Eco-Compost/Topsoil ($15/cu. yd.) (9.25 cu. yd/res. yard)			6,938
Rock (5 cu. yd./res. yard)			3,750
Sod ($0.4/sq. ft.) (1,500 sq. ft./res. yard)			30,000
	Subtotal (50 residential yards)		203,563
Mobilization/Demobilization (20%)		40,713	
Safety and Health (5%)		10,178	
	Total (50 residential yards)	254,454	
(Contingencies @ 20%)		50,891	
		$305,345	
Railroad Bed Component (10,000 linear feet)			
Capping and Roadway Separation			
Placement and Grading of Rock ($1,500/100ft.)			150,000
Crushed Stone (4" @ $15/ton) (157 tons/100 ft.)			235,500
Concrete Curbing ($3/foot) (50/100 ft.)			15,000
	Subtotal (10,000 linear feet)		400,500
Mobilization/Demobilization (20%)		80,100	
Safety and Health (5%)		20,025	
	Total (10,000 linear feet)		500,625
(Contingencies @ 20%)		100,125	
		$600,750	
Operation and Maintenance Costs			
Institutional Control Component			
Capital Cost			50,000
Community Protective Measures Program (per year)			75,000
Net present value calculated using a 7% discount value over a 30-year period			$1,369,325
Totals			
Capital Costs (Residential Soil and Railbed Components)			
906,095			
Operation and Maintenance Costs			
	$1,369,325		
Present Value			
			$2,275,420

FIGURES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APPENDIX A
ARARs

FINAL DRAFT
IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, STANDARDS, CONTROLS CRITERIA, OR LIMITATIONS FOR THE ANACONDA SMELTER SUPERFUND SITE, COMMUNITY SOILS OPERABLE UNIT REMEDIAL ACTION

INTRODUCTION

Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), the National Oil and Hazardous Substances Pollution Contingency Plan (the "NCP"), 40 CFR Part 300 (1990), and guidance and policy issued by the Environmental Protection Agency ("EPA") require that remedial actions under CERCLA comply with substantive provisions of applicable or relevant and appropriate standards, requirements, criteria, or limitations from State of Montana and federal environmental laws and state facility siting laws during and at the completion of the remedial action. These requirements are threshold standards that any selected remedy must meet.

This document identifies final ARARs that are expected to apply to the activities to be conducted under the Community Soils Operable Unit ("CS OU") remedial action. The following ARARs or groups of related ARARs are each identified by a statutory or regulatory citation, followed by a brief explanation of the ARAR and how and to what extent the ARAR is expected to apply to the activities to be conducted under this remedial action. The descriptions given here are provided to allow the reader a reasonable understanding of each requirement without having to refer constantly to the statute or regulation itself and to provide a brief explanation of how the requirement is to be applies in the specific circumstances involved at this OU.

Although the ROD for the CS OU does not require remediation of ground or surface water and does not require compliance with water ARARs, several ground and surface water quality ARARs are nevertheless outlined herein. This is done to promote consistency with the Anaconda Regional Water, Waste, and Soils (ARWW&S) OU remedial action which will require compliance with water ARARs, and as a reminder that the cleanup at the CS OU may not adversely affect water quality. Consistency with the ARWW&S OU action and protection of water resources during the CS OU action will be achieved through the use of best management practices to minimize releases of contaminants from soil and railroad bed materials to water media.

Substantive provisions of the requirements listed below are identified as ARARs pursuant to 40 CFR § 300.400. ARARs that are within the scope of this remedial action must be attained during and at the completion of the remedial action. No permits are anticipated for the remedial action for the CS OU in accordance with Section 121 (e) of CERCLA.

TYPES OF ARARs

ARARs are contaminant, location, or action specific. Contaminant specific requirements address chemical or physical characteristics of compounds or substances on sites. These values establish acceptable amounts or concentrations of chemicals which may be found in or discharged to the ambient environment.

Location specific requirements are restrictions placed upon the concentrations of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs relate to the geographical or physical positions of sites, rather than to the nature of contaminants at sites.

Action specific requirements are usually technology based or activity based requirements or limitations on actions taken with respect to hazardous substances, pollutants or contaminants. A given cleanup activity will trigger an action specific requirement. Such requirements do not themselves determine the cleanup alternative, but define how chosen cleanup methods should be performed.

Many requirements listed as ARARs are promulgated as identical or near identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by EPA and the state. The Preamble to the NCP provides that such a situation results in citation to the state provision and treatment of the provision as a federal requirement.

I. CONTAMINANT SPECIFIC ARARs

A. Federal and State Groundwater and Surface Water ARARs.

Final remediation of groundwater and surface water is not within the scope of the CS OU and will be addressed under the ARWW&S OU. EPA identifies certain groundwater and surface water requirements herein for the purposes of 1) prohibiting degradation of these media by this response action, particularly with respect to the railroad beds, and 2) achieving consistency with the ARWW&S OU response action. Specifically, these ARARs are intended to aid in the identification of contamination from the soils and railroad beds to groundwater and surface water. It is not expected that the groundwater and surface water requirements identified herein will be performance standards or final ARARs for the CS OU. Consistency between the RWW&S OU and the CS OU will be achieved through identification of releases from the soils or contaminated railroad beds and minimization of releases that would result in unacceptable adverse impacts to groundwater and surface water.

1. The Federal Clean Water Act, 33 U.S.C. §§ 1251, et seq.

General. The Clean Water Act provides the authority for each state to adopt water quality standards (40 CFR Part 131) designed to protect beneficial uses of each water body and requires each state to designate uses for each water body. Pursuant to this authority and the criteria established by Montana surface water quality regulations, ARM § 16.20.601, et seq., Montana has established the Water-Use Classification system. Under ARM § 16.20.604, Warms Springs Creek has been classified B-1. Certain the B-1 standards, codified at ARM § 16.20.623, as well as Montana's nondegradation requirements, are presented below.

2. Surface and Groundwater Quality Requirements. Montana Water Quality Act, MCA § M75-5-101 et seq., and implementing regulations.

a. Water, general.

i. MCA § 75-5-303 (applicable). This section provides that existing uses of state waters and the level of water quality necessary to protect those uses must be maintained.

ii. MCA § 75-5-606 (applicable). This section

prohibits the causing of pollution of any state waters or the placing of wastes where they will cause pollution of any state waters.

b. Surface Water.

i. Arm § 16.20.618 (applicable). Waters classified B-1 are, after conventional treatment, suitable for drinking, culinary and food processing purposes. These waters are also suitable for bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and use for agricultural and industrial purposes. This section provides also that concentrations of carcinogenic, bioconcentrating, toxic or harmful parameters which would remain in water after conventional water treatment may not exceed standards set forth in department circular WQB-7, as well as other specified criteria.

ii. ARM § 16.20.633 (applicable). Prohibits discharges containing substances which will settle, create floating debris, scum, or film, produce odors, create colors or other conditions creating a nuisance, or create concentrations or combinations of materials which are toxic, or create conditions which produce undesirable aquatic life.

iii. ARM § 16.20.708 (applicable). Existing and anticipated uses of surface water and water quality to support those uses must be maintained.

iv. General Discharge Permit for Storm Water Associated with Construction Activity, Permit no. MTR100000 (November 17, 1992) (applicable). The requirements of this permit are applicable for stormwater runoff from construction activities.

c. Groundwater.

i. ARM § 16.20.1002 and -1003 (applicable. Groundwater in the CS OU is classified as I and must meet the standards for Class I groundwater.

ii. ARM § 16.20.1011 (applicable). This section provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless the board is satisfied that a change is justifiable for economic or social development and will not preclude present or anticipated use of such waters. Concentrations of dissolved substances in Class I groundwater may not exceed the human health standards listed in department Circular WQB-7, as well as other specified criteria.

B. Federal and State Air Quality Requirements.

1. National Ambient Air Quality Standards, 40 CFR § 50.6 (PM-10); 40 CFR § 50.12 (lead) (applicable). These provisions establish standards for PM-10 and lead emissions to air. Corresponding state standards are found at ARM § 16.8.815 (lead) and ARM § 16.8.821 (PM-10.

2. Montana Ambient Air Quality Regulations, ARM §§ 16.8.807, -.815, and -.821 (applicable).

a. ARM § 16.8.807. This provision establishes sampling, data collection, and analytical requirements to ensure compliance with ambient air quality standards.

b. ARM § 16.8.809. Establishes sampling, data collection, recording, and analysis to ensure compliance with ambient air quality standards.

c. ARM § 16.8.815. Lead emissions to ambient air shall not exceed a ninety (90) day average of 1.5 micrograms per cubic liter of air.

d. ARM § 16.8.818. Settled particulate matter shall not exceed a thirty (30) day average of 10 grams per square meter.

e. ARM § 16.8.821. PM-10 concentrations in ambient air shall not exceed a 24 hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

II. LOCATION SPECIFIC REQUIREMENTS

The statutes and regulations set forth below relate to the preservation of certain cultural, historic, natural, or other national resources which may be adversely affected by the CS OU remedial action. They require that such resources be identified, and that steps be taken to minimize the impact of the remedial action upon any such resource.

A. National Historic Preservation Act, 16 U.S.C. § 470, 40 CFR § 6.301(b), 36 CFR Part 800 ("NHPA") (applicable). This statute requires Federal agencies to take into account the effect of this response action upon any district, site, building, structure, or object that is included in or eligible for the Register of Historic Places. In addition, Indian cultural and historical resources must be evaluated, and effects avoided, minimized, or mitigated. Compliance with NHPA requirements will be attained through the Regional Historic Preservation Plan as implemented pursuant to agreements entered into with EPA and Anaconda/Deer Lodge.

B. Historic Sites, Buildings and Antiquities Act, 16 U.S.C. § 461 et seq.; 40 CFR § 6.310 (a) (applicable). This provision requires federal agencies to consider the existence and location of land marks on the National Registry of National Landmarks and to avoid undesirable impacts on such landmarks.

C. Endangered Species Act, 16 U.S.C. § 1531, 40 CFR § 6.302(h), 50 CFR Parts 17 and 402 (applicable). This statute and implementing regulations provide that federal activities not jeopardize the continued existence of any threatened or endangered species. Based upon available information and investigations to date, and consultation with the U.S. Fish and Wildlife Service, no designated threatened or endangered species or their habitat are expected to be affected by this remedial action.

D. Floodplain Management, 40 CFR § 6.302(b), and Executive Order No. 11988. These require that actions be taken to avoid, to the extent possible, adverse effects associated with direct or indirect development of a floodplain, or to minimize adverse impacts if no practicable alternative exists.

E. State of Montana Floodplain and Floodway Management Act and Regulations (all applicable).

1. MCA § 76-5-402, ARM 36.15.701 and 702. These specify uses allowed in the floodplain, excluding the floodway, and allow residential, commercial, or industrial structures meeting

certain minimum standards including those relating to placement of fill, roads, and floodproofing.

2. ARM 36.15.602(5), 605 and 703. Solid and hazardous waste disposal and storage of toxic, flammable, hazardous, or explosive materials are prohibited anywhere in floodways or floodplains.

3. ARM 36.15.606. Requires compliance with standards for levees, floodwalls, and riprap.

4. ARM 36.15.701(3) (c) and (d). Roads, streets, highways and rail lines must be designed to minimize increases in flood heights, Structures and facilities for liquid or solid waste treatment and disposal must be floodproofed to ensure that no pollutants enter flood waters and may be allowed and approved only in accordance with regulations.

III. ACTION SPECIFIC REQUIREMENTS

The statutory and regulatory requirements set forth below govern the implementation of the CS OU, including design and construction activities. Anticipated remedial action activities include the removal and disposal of residential soils, the revegetative treatment of commercial/industrial soils, and the construction of engineered covers over railroad bed materials and/or other commercial/industrial soils. The railroad lines within the CS OU are part of an active rail system and therefore, the materials associated with the operation of these lines are not considered solid waste. Soils to be removed from residential areas are not to be considered solid waste because they may be useful as cover material at other locations on the Anaconda Smelter NPL Site, provided the soils contain no more contaminants than may be compatible with the intended uses for those other locations. Soils removed from residential areas will be used either as cover material or will be consolidated on-site within other contaminated areas which will be addresses under the ARWW&S OU. Solid waste disposal requirements are identified herein for the purpose of governing management of these areas until final closure.

It is not expected that the solid waste requirements identified herein will be performance standards or final ARARs for the CS OU. Some of these will be considered relevant and appropriate for the temporary storage or management of solid waste until final closure under the ARWW&S OU.

A. Federal and State RCRA Subtitle D Requirements (applicable at time of ARWW&S OU).

40 CFR Part 257 establishes criteria under Subtitle D of the Resource Conservation and Recovery Act for use in determining which solid waste disposal facilities and practices may reasonably be expected to adversely affect public health or the environment. See 40 CFR § 257.1(a). This part comes into play whenever there is a "disposal" of any solid or hazardous waste from a "facility." "Disposal" is defined ad "the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any water, including ground water." See 40 CFR § 257.2. "Facility" means "any land and appurtenances thereto used for the disposal of solid wastes." Solid waste requirements are listed herein because the possibility that there may be disposal of solid wastes as a

result of this remedial action has not yet been eliminated.

1. 40 CFR § 264.257 (incorporated by reference in Montana under ARM § 16.44.702). Criteria for Classification of Solid Waste Disposal Facilities and Practices. The activities to be performed for the CS OU remedial action are expected to comply with the following requirements.

a. 40 CFR § 264.257.3-1. Washout of solid waste in facilities in a floodplain posing a hazard to human life, wildlife, or land or water resources shall not occur.

b. 40 CFR § 264.257.3-2. Facilities shall not contribute to the taking of endangered species or the endangering of critical habitat of endangered species.

c. 40 CFR § 264.257.3-3. A facility shall not cause a discharge of pollutants, dredged or fill material, into waters of the United States in violation of sections 402 and 404 of the Clean Water Act, as amended, and shall not cause nonpoint source pollution, in violation of applicable legal requirements implementing an areawide or statewide water quality management plan that had been approved by the Administrator under Section 208 of the Clean Water Act, as amended.

d. 40 CFR § 264.257.3-4. A facility shall not contaminate an underground source of drinking water beyond the solid waste boundary or beyond an alternative boundary specified in accordance with this section.

e. 40 CFR § 264.257.3-8. Access to a facility shall be controlled so as to prevent exposure of the public to potential health and safety hazards at the site.

2. State of Montana Solid Waste Requirements.

a. ARM § 16.14.523. Specifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling, or leaking from the transport vehicle.

b. ARM § 17.50.505(1). Facilities for the treatment, storage or disposal of solid wastes must be: (1) located where a sufficient acreage of suitable land is available for solid waste management; (2) not be located in a 100-year flood plain; (3) be located only in areas which will prevent the pollution of ground and surface waters and public and private water supply systems; (4) be located to allow for reclamation and reuse of the land; (e) have drainage structures installed where necessary to prevent surface runoff from entering waste management areas; and (f) be limited to Class III disposal facilities, where underlying geological formations contain rock fractures or fissures which may lead to pollution of the ground water or areas in which springs exist that are hydraulically connected to a proposed disposal facility.

c. ARM § 17.50.505(2). Specifies standards for solid waste management facilities, including the requirements that Class II landfills must confine solid waste and leachate to the disposal facility. If there is a potential for leachate migration, it must be demonstrated that leachate will only migrate to underlying formations which have no hydraulic continuity with any state waters; adequate separation of group II wastes from underlying or adjacent water must be provided; and no new disposal units or lateral expansions may be located in wetlands. This

provision also specifies general soil and hydrogeological requirements pertaining to facility siting.

d. ARM § 17.50.212. Prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the state or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted.

e. ARM § 17.50.506. Specifies design requirements for landfills. MCLs may not be exceed, or the landfill must contain a composite liner and leachate collection system in compliance with listed criteria.

f. ARM § 17.50.513. Specifies general operational and maintenance and design requirements including run-on and run-off control systems, fencing, and point and non-point source discharge in violation of Clean Water Act.

g. ARM § 17.50.530 and 531. These set forth post closure care requirements for Class II landfills. Post closure care must be conducted for a period sufficient to protect human health and the environment. Post closure care requires maintenance of the effectiveness of any final cover, and compliance with groundwater monitoring requirements found at ARM Title 16, chapter 14, subchapter 7.

B. Montana Strip and Underground Mine Reclamation Act, M.C.A. § 82-4-201 and following (relevant and appropriate).

Certain discrete portions of the following regulatory provisions, to the extent they address changes in water quality and quantity, grading requirements, erosion control, and stabilization measures, may be relevant and appropriate for the replacement of residential soils and/or the management of removed soils in an on-site disposal or consolidation area.

1. ARM § 26.4.501(3) (a) and (d) and (4). Backfill must be placed so as to minimize sedimentation, erosion, and leaching of acid or toxic materials into waters, unless otherwise approved.

2. ARM § 26.4.501(A) (a) and (2). Final graded slopes will be 5:1 unless otherwise approved. If steeper, slopes must have a long term static safety factor of 1:3, not to exceed the angle of repose unless the existing grade of the area is steeper, in which case the existing grade meets this requirement. Disturbed areas must be blended with undisturbed ground to provide a smooth transition in topography.

3. ARM § 26.4.514. Final grading will be done along the existing contour in order to minimize subsequent erosion and instability, unless otherwise approved.

4. ARM § 26.4.519. Pertinent areas of the CS OU where excavation will occur will be regraded to minimize settlement.

5. ARM § 26.4.631(1), (2), (3) (a) and (b). Disturbances to the prevailing hydrologic balance will be minimized. Changes in water quality and quantity, in the depth to groundwater and in the location of surface water drainage channels will be minimized, to the extent consistent with the selected remedial alternatives.

6. ARM § 26.4.633. Surface drainage from a disturbed area must be treated by the best technology currently available (BTCA). Treatment must continue until the area is stabilized.

7. ARM § 26.4.638(1) (a) and (c) and (2). Practices to prevent or minimize sedimentation and erosion will employed to the extent possible.

8. ARM § 26.4.634. Disturbed drainages will be restored to the approximate pre-disturbance configuration, to the extent consistent with the selected remedial alternatives.

9. ARM § 26.4.638(2). Sediment control measures must be implemented during operations.

10. ARM § 26.4.641. Practices to prevent drainage from acid or toxic forming spoil material into ground and surface water will be employed.

11. ARM § 26.4.702(4), (5) and (6). Practices to prevent compaction, slippage, erosion, and deterioration of biological properties of soil will be employed.

12. ARM § 26.4.703. When using materials other than, or along with, soil for final surfacing in reclamation, the operator must demonstrate that the material (1) is at least as capable as the soil of supporting the approved vegetation and subsequent land use, and (2) the medium must be the best available in the area to support vegetation. Such substitutes must be used in a manner consistent with the requirements for redistribution of soil in ARM § 26.4.701 and 702.

13. ARM § 26.4.711. Requires that a diverse, effective and permanent vegetative cover of the same seasonal variety and utility as the vegetative native to the area of land to be affected must be established. This provision would not be relevant and appropriate in certain instances, for example, where there is dedicated development.

14. ARM § 26.4.713. Seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seedbed preparation but may not be more than 90 days after soil has been replaced.

15. ARM § 26.4.714. Mulch or cover crop or both must be used until adequate permanent cover can be established.

16. ARM § 26.4.716. Establishes method of revegetation.

17. ARM § 26.4.718. Requires soil amendments, irrigation, management, fencing, or other measures, if necessary to establish a diverse and permanent vegetative cover.

18. ARM § 26.4.728. Sets forth requirements for the composition of vegetation on reclaimed areas.

19. ARM § 26.4.751. Measures to prevent degradation of fish and wildlife habitat will be employed.

20. ARM § 26.4.761(2) (a), (e), (h), (j), and (k). These provisions specify fugitive dust control measures which will be employed during excavation and construction activities to minimize the emission of fugitive dust in the CS OU. These provisions are

addressed below in Section III.C.

C. Air Requirements (all applicable).

1. ARM § 16.8.1401(2), (3), and (4). Airborne particulate matter. There shall be no production, handling, transportation, or storage of any material, use of any street, road, or parking lot, or operation of a construction site or demolition project unless reasonable precautions are taken to control emissions of airborne particles. Emissions shall not exhibit an opacity exceeding 20% or greater averaged over 6 consecutive minutes.

2. ARM § 16.8.1404(2). Visible Air Contaminants. Emissions into the outdoor atmosphere shall not exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

3. ARM § 16.8.1427. Nuisance or odor bearing gases. Gases, vapors, and dusts will be controlled such that no public nuisance is caused within the CS OU.

4. ARM § 26.4.761(2) (a), (e), (h), (j), and (k). Fugitive dust control measures such as 1) watering, stabilization, or paving of roads, 2) vehicle speed restrictions, 3) stabilization of surface areas adjoining roads, 4) restriction of travel on other than authorized roads, 5) enclosing, covering, watering, or otherwise treating loaded haul truck, 6) minimizing area of disturbed land, and 7) revegetation, must be planned and implemented, if any such measure or measures are appropriate for this remedial action.

D. Air Quality Requirements (applicable).

Remedial activities will comply with the following requirements to ensure that existing air quality will not be adversely affected by the CS OU remedial action.

1. ARM § 16.8.815. The concentration of lead in ambient air shall not exceed a 90 day average of 1.5 micrograms per cubic meter of air.

2. ARM § 16.8.818. Settled particulate matter shall not exceed a 30 day average of 10 grams per square meter.

3. ARM § 16.8.821. The concentration of PM-10 in ambient air shall not exceed a 24 hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

RESPONSIVENESS SUMMARY

COMMUNITY SOILS
OPERABLE UNIT
ANACONDA SMELTER NPL SITE
ANACONDA, MONTANA

September 25, 1996

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS

ADLC	Anaconda-Deer Lodge County
ADRA	Anaconda-Deer Lodge Reclamation Advocates
AEEI	Anaconda Environmental Education Institute
AGC	Advanced GeoServices Corporation
AMC	Anaconda Mining Company
AUC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
ARCO	Atlantic Richfield Company
A.R.M.	Annotated Rules of Montana
ARWWS	Anaconda Regional Water, Waste, and Soils
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
C.F.R.	Code of Federal Regulations
CPMP	Community Protective Measures Program
DEQ	State of Montana Department of Environmental Quality
DPS	Development Permit System
EE/CA	Engineering Evaluation/Cost Analysis
EMSI	Environmental & Mining Systems International
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
HHRA	Human Health Risk Assessment
ICs	Institutional Controls
IEUBK	Integrated Exposure Uptake/Biokinetic
M.C.A.	Montana Code Annotated
mg/day	milligrams per day
NCP	National Contingency Plan
NPL	National Priorities List
OU	Operable Unit
OW/EADA	Old Works/East Anaconda Development Area
ppm	parts per million
PRP	Potentially Responsible Party
RARUS	RARUS Railway Company
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
TAG	Technical Assistance Grant

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) has prepared this Responsiveness Summary in conjunction with the Record of Decision (ROD) to document and respond to issues and comments raised by the public regarding the Remedial/Investigation/Feasibility Study (RI/FS) and the Proposed Plan for the Community Soils Operable Unit (OU) of the Anaconda Smelter National Priorities List (NPL) Site. Comments were received during the Public Comment Period from July 8 through August 9, 1996. These comments, and responses to them, are outlined in this document. By law, the EPA must consider public input before making a final decision on a cleanup remedy. Once public comment is addressed, the final decision on a cleanup remedy will be documented in the ROD.

1.1 COMMUNITY INVOLVEMENT BACKGROUND

EPA has conducted community involvement activities for the Community Soils OU in accordance with state and federal laws and EPA Superfund guidance documents. From the beginning of the RI/FS process for the Community Soils OU, EPA has conducted community relations activities and sought the involvement of the public and the Potentially Responsible Party (PRP), Atlantic Richfield Company (ARCO).

1.2 PUBLIC MEETING PUBLICITY

Press releases were sent to The Anaconda Leader to announce each public meeting and the Public Comment Period. The public meetings were then advertised in this newspaper. Print advertisements were display style, conspicuously large (quarter page), and were placed in a widely-read section of the paper.

1.3 ADMINISTRATIVE RECORD

The Administrative Record is the set of documents identified for the Community Soils OU upon which the selection of the remedy is based. The Administrative Record is required by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) §113(k). The Administrative Record (on microfilm) is available for public review at the Hearst Free Public Library in Anaconda, and the Montana Tech Library in Butte, with the complete Administrative Record located at the EPA Records Center in Helena.

1.4 DOCUMENT REPOSITORIES

Key documents relating to the Community Soils OU are also available at the Hearst Free Public Library in Anaconda and at the EPA Records center in Helena.

1.5 CITIZENS GROUPS

The Anaconda-Deer Lodge Reclamation Advocates (ADRA) organization was formed in 1988 by members of Citizens in Action and the Anaconda Deer-Lodge Environmental Advisory Council to work towards economic recovery. ADRA has met regularly with EPA and ARCO to discuss Superfund activities taking place in the Clark Fork Basin. ADRA has co-sponsored public Superfund meetings with EPA.

ADRA and the Arrowhead Foundation, a non-profit community group focusing on the effort to establish a world-class, Jack Nicklaus-designed golf course in the Old Works/East Anaconda Development Area (OW/EADA) OU, recently combined organizations to keep involved in Superfund activities. This organization (Arrowhead) recently received a Technical Assistance Grant (TAG) from EPA to further evaluate Superfund activities and processes at the site. Arrowhead hired the Anaconda Environmental Education Institute (AEEI) to provide support in the review of technical issues.

The Opportunity Concerned Citizens organization was formed to provide input and direction concerning the Warm Springs Proposed Plan. This group has shown interest in certain OUs. EPA and State of Montana Department of Environmental Quality (DEQ) officials stay in contact with this group.

1.6 LOCAL GOVERNMENT

Anaconda-Deer Lodge County (ADLC) had been very active in Superfund activities at the site. EPA meets regularly with ADLC to discuss project objectives and community needs. In addition, ADLC, along with Butte-Silver Bow County, have hired a technical consultant to review site information.

1.7 Progress Reports

Since the NPL listing of the Anaconda Smelter NPL Site in 1983, EPA and DEQ have produced numerous Progress Reports and Fact Sheets that discuss Superfund issues at the Anaconda Smelter NPL Site. Many of these printed materials have been site-specific and have discussed issues relating to specific OUs.

These Progress Reports and Fact Sheets contained information on released documents, meetings, site activities, completion of projects, sampling results, etc. They were sent to those individuals on the site mailing list and extra copies were distributed at public meetings. Copies of previous Progress Reports and Fact Sheets are contained in the Anaconda Smelter NPL Site Administrative Record.

1.8 MAILING LIST

EPA maintains the Anaconda Smelter NPL Site mailing list on a computer database and updates this list as needed. Currently, approximately 350 individuals and organizations are included on the list. EPA actively solicits additions to the mailing list in the Fact Sheets, the Proposed Plan, and at public meetings.

1.9 CHRONOLOGY OF COMMUNITY RELATIONS ACTIVITIES

1983-1996 Numerous site-wide community relations activities were conducted at the Anaconda Smelter NPL Site. This included the development of a Community Relations Plan, which was last revised in 1992.

EPA and DEQ officials conducted extensive community relations activities in Anaconda and Opportunity, Montana, over the years. A part-time Community Relations Liasion worked in Anaconda for several years. In addition, the EPA Community Involvement Coordinator has conducted numerous small and large group meetings and extensive Community Relations activities in Anaconda and Opportunity. An EPA-sponsored Bureau of Reclamation employee oversees construction activities, and has been a community point-of-contract since 1990.

EPA officials were readily available to local news media which resulted in frequent site coverage in local newspapers. Many meetings with local groups (ADRA/Arrowhead, TAG) and local government were held to inform the public of the progress of this and other projects.

February 1995 A Health Risk Fact Sheet was published to explain potential health risks associated with arsenic and EPA's approach for assessing those risks.

March 1996 An update of Superfund activities was provided in a March 1996 Fact Sheet and EPA held an informational meeting in Anaconda on March 14, 1996, to explain the RI/FS process and to discuss overall site progress, activities, and schedules.

July 1996 EPA sent out the Proposed Plan to the site mailing list. A display ad and legal ad for the Proposed Plan, Public Comment Period, and meeting dates were published in The Anaconda Leader on July 5 and 10, 1996.

A formal public hearing was held in Anaconda on July 18, 1996. At this hearing, representatives from EPA answered questions about remedial alternatives under consideration, as well as the preferred remedy published in the Community Soils Proposed Plan.

July 1996 EPA received public comments on the Community Soils Proposed Plan

from July 8 through August 9, 1996.

2.0 EXPLANATION OF RESPONSIVENESS SUMMARY

Three types of comments were received on the Proposed Plan by EPA during the Public Comment Period. These were:

- Comments received at the July 18, 1996 public meeting. The oral comments that were given at the formal public meeting were recorded and transcribed by a court reporter. Responses to these comments are provided in Section 3.0. In addition, questions and answers preceded the formal comments. A copy of the transcript of the formal public meeting, included formal comments, is provided in Attachment A.

- Written comments received by EPA during the Public Comment Period. Copies of these comments can be found in Attachment B. EPA's responses to these comments are in Section 3.1.2.

- Written comments received by EPA from ARCO. Copies of these comments are provided in Attachment B. EPA's responses to these comments are in Section 3.2.

Written comments were received from the following groups and individuals:

- 4 Private citizens;
- 1 Local environmental education group;
- 1 Local business;
- 1 Contractor for other federal agency; and
- ARCO

It should be noted that while only the formal public comments and comments from ARCO are presented and responded to in this Responsiveness Summary, EPA has also considered other information in the remedy selection process. EPA has considered information from meetings held among EPA, DEQ, ARCO, ADLC local government officials, and other parties during the RI/FS and during the Public Comment Period. EPA has also considered additional written submittals from ARCO, including their applicable or relevant and appropriate requirements (ARARs) scoping documents, risk assessment documents, and correspondence related to the RI/FS and remedy selection.

All comments received, including those provided to EPA prior to the Public Comment Period, have been reviewed and considered by EPA in the decision-making process. These comments are addressed, either explicitly or implicitly, in this Responsiveness Summary and in the ROD, in RI/FS documents, or in correspondence contained in the Administrative Record.

The comments and responses have been organized into two parts:

Part I. Section 3.1 - Public Comments, includes summaries of most remarks made by citizens, local government, community groups, and local and state environmental organizations. Each comment is followed by EPA's response. Policy comments and responses are generally included with the public comments.

Part II. Section 3.2 - ARCO Comments, provides a set of technical and legal comments from ARCO and EPA's detailed response, including comments on ARARs and the Final Baseline Human Health Risk Assessment (HHRA).

2.1 SIGNIFICANT COMMENTS

Of the comments received by EPA during the Public Comment Period, one comment has resulted in an important change to the ROD. Based on this comment, received at the July 18, 1996 public meeting, and on subsequent input from the State and ARCO, EPA has formally identified commercial/industrial properties as residential areas within the Community Soils OU, and has specified an action level and remedy for such properties in this ROD.

The RI/FS and Proposed Plan were released for public comments in July 1995. Because data contained in the Remedial Investigation (RI) did not identify commercial/industrial areas of

concern, the Feasibility Study (FS) and Proposed Plan did not identify alternatives for addressing those areas within the site. Previously sampled commercial/industrial areas were generally below risk-based screening levels. However, during the Public Comment Period, concerns were expressed regarding specific commercial/industrial areas that have not been sampled.

Since the Selected Remedy will address commercial/industrial properties associated with certain residential soils or properties containing railroad bed materials, and since most other commercial/industrial areas at the site are currently being addressed under the OW/EADA ROD, EPA has determined that it is appropriate to formally address all remaining current and future commercial/industrial land use areas at the Anaconda Smelter NPL Site under this Selected Remedy. Although commercial/industrial areas were not specifically evaluated in the FS, sufficient information exists to include them in the Selected Remedy. As discussed in this ROD, EPA will address these areas in the same manner that other commercial/industrial areas are currently being addressed at the site. Components of both the Community Soils and OW/EADA Selected Remedy (engineered covers, soil treatment, and Institutional Controls (ICs)) will also apply to the remaining commercial/industrial areas. This includes the selected 500 ppm soil arsenic cleanup level. This approach is consistent with the final cleanup strategy for the site.

3.0 RESPONSES TO COMMENTS

The following section is divided into two parts. The first part lists the public comments that are generally non-technical in nature. These include general comments regarding the Preferred Alternative and the ability of the Preferred Alternative to meet permanence criteria, concerns about specific areas of the Community Soils OU. The second part discusses specific comments from ARCO relating to ARARs, the RI, and the Final Baseline HHRA (CDM Federal 1996).

3.1 PUBLIC COMMENTS

The following comments are generally of a non-technical nature. They are divided into comments received at the formal public meeting and written comments. Each comment is identified and, in most cases, the comments are quoted directly. In some instances, the comments are paraphrased. EPA's responses are stated after each comment.

3.1.1 COMMENTS AT THE FORMAL PUBLIC MEETING

The following are comments received at the formal public meeting held July 18, 1996. A transcript of the meeting is provided in Attachment A. Each individual comment is identified and EPA's responses follow each comment. The comment is italicized and EPA's response is in regular type.

3.1.1.1 Comments from Ms. Sandy Stach (ARCO)

Comment A: "...I think the real good news out of this whole thing is that this community [Anaconda] is not at risk...I think additionally, since this work has limited this down to basically a 14-block area, that as near as I can tell, about four to six of them were in the [Benny Goodman] park or non-residential, that we've really got a small focused area that we need to be concerned about. Thats important for anyone who has ever tried to sell a house here because that means there's 95 percent of the community that basically does not need to worry about this issue in that regard."

Response: Although the risks are generally low for the community, there are individual yard areas that may have elevated soil arsenic concentrations above the action level which will require remediation.

Comment B: "...With the exception of Teresa Ann Terrace, which had some old deposits from the Old Works that came from the smelters in the form of tailings, we did not see any elevated level of arsenic below the two-inch level. So if you live in an area that is in the focus area subject to sampling, I would be extremely surprised in out of just thousands and thousands of samples that were taken, that you would see anything below the two-inch level. That differs a lot from Butte because everything was built on mining waste, you see elevated levels at deeper depths. Here, because it was from the stack, it's very, very shallow. So I think that's something people need to take note of."

Response: EPA generally agrees with this comment. Of the 69 subsurface samples (usually collected at 2- to 10-inch and 10- to 24-inch depths) collected in Anaconda, only seven were greater than 250 ppm arsenic concentration. Only three of these were located in residential areas not believed to be influenced by wastes from the Old Works. Therefore, EPA anticipates that most of the yard removals will focus on near-surface soils.

Comment C: "...Charlie did the best job I've heard in a long time explaining kriging, but what people need to realize, if you live in [a Focus Area], it doesn't mean you have high soil levels, it means you have a chance of having high soil levels. That's why some of the sampling is as important as it is...We would view this as something that the landowner very much have the prerogative to have a place in the county they could call if they have a question and feel that they may have a concern about a bald spot in their area, should they live in the Focus Area in town or whatever...And the key elements that [ARCO] would be willing to fund with the County are basically education [and] the sampling...We would expect to

provide money to the County such that they can go out and take some samples and then get back to you without [ARCO] ever being involved...[W]e feel [the County is] in a much better position to do that. Clearly, we will give them the resources to do that and finally give them the resources for any sodding or anything that would need to be done in bare areas that might have elevated levels in those [F]ocus [A]reas..."

Response: EPA acknowledges these comments, and looks forward to the full funding by ARCO of all necessary ICs.

3.1.1.2 Comment from Mr. Bill McCarthy (RARUS Railway Company)

Comment: "I think our initial view on the proposed alternative for the railroad bed is basically acceptable. We reserve the right to comment and maybe suggest some ideas and bring up some concerns that may not be readily noticeable, but I think it's headed in the right direction. We would like to be part of the work plan and...tell our ideas on how to maybe improve the remedy. But basically, I think it's headed in the right direction."

Response: EPA plans to include the RARUS Railway Company, as with any involved landowner in the Remedial Design Process.

3.1.1.3 Comment from Ms. Ellen Tocher

Comment: "...I live in the focused area...probably in the middle of it. When I got the Proposed Plan and [saw] that were right in the middle of this [F]ocus [Areas], I kind of thought, oh, my God. But you relieved my fears tonight to know that we might not have this arsenic in our yard or that we were just picked out of the whole city."

Response: Based on kriging, the Focus Area indicates where elevated soil arsenic concentrations may exist. Additional sampling during the Remedial Design will be needed to confirm the location of any areas above the action level which will require remediation.

3.1.1.4 Comment from Mr. John Sevores

Comment: "I'm a resident of Deer Lodge County and I would like to make a request of Sandy Stash and Atlantic Richfield. And that is that in the Copper Village Art Museum, they have a copy of the Bliss case which involves the Anaconda Company [and] Standard Oil. It's 15 volumes. It's reference that tells the whole history of this valley, about what happened when the industrialists beat the farmers to death...Is there any way possible that Atlantic Richfield could provide a reading copy at the Hearst Free Public Library of the Bliss case so that people that wonder what is happening with this valley, what is the history of this valley, and why it is the way it is...Basically the Anaconda Company bought this valley...[I]t would be nice for research if you could actually read a copy of the case rather than it being locked up at someplace where it isn't really accessible to the amount of time that it would take to research [it]."

Response: EPA copied the Bliss case and sent it to the Hearst Free Public Library for Mr. Sevores and others to see.

3.1.2 WRITTEN COMMENTS SUBMITTED TO EPA

Comment: "I am in favor of the EPA's plan for eliminating dangerous levels of arsenic in Anaconda. But I would also like the EPA to test the dirt road in front of my house. Please respond."

Response: All barren areas within the Focus Area will be evaluated. If this area is outside the Focus Area, this request should be made to the county after the Community Protective Measures Program (CPMP) is put in place.

3.1.2.2 Comment from Mrs. Nicki Leiss

Comment: "I fully agree with the alternative that you [EPA] have chosen to clean up residential soils here in Deer Lodge County and I say go full steam ahead with that. But in handling the Railroad Beds here you must fully clean them up also by using Alternative 3 instead of Alternative 2."

Response: EPA has rated the relative performance of each railroad bed alternative with respect to the nine evaluation criteria. Of the railroad bed alternatives presented in this ROD, only Alternatives 2 and 3 meet the threshold criteria, meaning that they are fully protective of human health and the environment and attain ARARs. Of the balancing criteria, Alternative 3 has a distinct advantage in long-term effectiveness and permanence as compared to Alternative 2. Alternative 2, however, would have significantly less short-term impacts, implementability issues, and cost. In comparing Alternative 2 to Alternative 3, the balancing criteria favor Alternative 2.

With respect to the modifying criteria, community interests favor Alternative 2, because the railroad bed is under an active line and the Selected Remedy would be much less disruptive. The State of Montana has also indicated preference for Alternative 2 as the Selected Remedy.

3.1.2.3 Comments from Dr. Wesley D. Granger

Comment A: "If possible, I would like to respectfully ask you why we can not at least name the Aspen Hill Creek area simply Aspen Hill Clear Creek District, instead of [a Superfund] site with all the accompanying negative connotation that goes with that name?"

Response: EPA has forwarded a copy of your letter to ADLC. ADLC is the entity that defined the Superfund Planning District through their county Master Plan (Peccia and Associates 1992). ADLC may choose to change the name of the district at the next opportunity to revise their Master Plan.

Comment B: "I would respectfully suggest that the same building permit process or whatever final building permit protocol that is finally decided would still be in place not compromising on the health of residents or the environment, while at the same time removing the stigma associated with the designation [as a Superfund] site."

Response: EPA acknowledges the comment.

Comment C: "I have no strong feelings regarding various proposals for making the arsenic levels in desired [areas] less than 250 parts per million. I only hope that the final plan would be based on science as well as maybe flexibility that would take into account on how one plans to use his own property."

Response: As provided in the ROD, residential soils which exceed a soil arsenic concentration of 250 parts per million (ppm) will be remediated through removal and replacement with clean soil and a vegetative or other protective barrier. This includes soils addressing future residential areas through the ADLC-Development Permit System (DPS). However, EPA is aware that this action may not be implementable in all areas dictated by site conditions. In those cases, other protective measures will be required (i.e., capping, treatment, ICs etc.).

3.1.2.4 Comments from Mr. John Sevores

Comment A: "This is a formal request to have the Department of Justice look into Superfund, starting with Milo Manning and [Val] Galle, and clean up the filthy waste from the Superfund City."

Response: The commenter's request was forwarded to Department of Justice.

Comment B: "This project has been steamrolled to skate the public review process. The

average person wouldn't know the Development Permit System and even those living in the [F]ocus [A]rea have no idea. They (the county) are not finished amending the master plan or Development Permit System, so how can there be any public comment when you are basing this decision on documents that are not public information yet?"

Response: EPA has worked hard to provide full and complete information on this project. EPA also understands that there is a public comment process, through the county, for developing or amending each of the above referenced documents. EPA is anticipating that these documents will incorporate the provisions necessary to implement the ICs identified as part of the Selected Remedy. However, if they do not, EPA will then look at contingency measures (as stated in the ROD) to accomplish the remediation goals of the project.

Comment C: Specific property was included in the action zone for Community Soils because of the property owner's opposition to Anaconda/Deer Lodge and ARCO activities.

Response: This Selected Remedy is intended to address all properties where soil arsenic concentrations exceed the appropriate action level for the anticipated land use (i.e., residential, commercial/industrial, agricultural, etc.). Focus Areas were identified using kriging methods as a best estimate for those soil concentrations. Certain properties may have been excluded on the basis of anticipated land use. If however, the anticipated use is incorrect, these areas will subsequently be included in the Focus Area.

3.1.2.5 Comment from the Anaconda Environmental Education Institute (AEEI)

Comment: "The Anaconda Environmental Education Institute (AEEI) is in support of the Community Soils Operable Unit Proposed Plan. This Plan is in the best interest of Anaconda-Deer Lodge County with respect to human health and the environment. Furthermore, we commend the EPA and ARCO on their efforts and cooperation with each other to devise a remedy that is not only cost-effective, but beneficial to the quality of life in Anaconda-Deer Lodges County."

Response: EPA acknowledges these comments.

3.1.2.6 Comments from Browning, Kaleczyc, Berry & Hoven, P.C., representing RARUS Railway Company

Comment A: "While the preferred alternative is generally acceptable to RARUS, we would recommend certain modifications. The use of large rock for capping areas within the shoulders of the railbeds, around switch stands, and at locations where utility easements exist under trackage or where signal wire is buried is problematic for maintenance and repairs. The large rock is very difficult to dig up, and can cause maintenance problems with ties and trackage. Therefore, we would suggest the use of clean ballast from shoulder to shoulder of the railbed and in other areas mentioned above."

Response: EPA generally agrees, and will consider this during Remedial Design.

Comment B: "Other lines, properties, or portions of lines may be suitable for remediation at this or some future time. In addition, there are properties adjacent to the railbed which may be suitable for non-railroad activities, such as commercial or residential development. Those areas may also need to be remediated. RARUS would be happy to discuss those potential areas with EPA at a future date."

Response: EPA generally agrees, and will consider this during the Remedial Design.

3.1.1.7 Comments from Environmental & Mining Systems International (EMSI)

Comment: Comments were raised regarding the methods, assumptions, and data used to produce kriging maps in the Soils Characterization Report. The comments were directed primarily at data selection and technical adjustments (or lack of) made

for anisotrophy.

Response: These comments have merit. Professional judgement instituted by EPA and ARCO contractors may result in kriged maps with somewhat different results compared to work being done by others. However, the kriged maps presented in the Soil Characterization Report were completed using adequate procedures and are sufficient to serve the Community Soils RI/FS as well as future investigative and planning tasks. Other methods of kriging using different models, data sets, and assumptions may produce slightly different, but still valid, kriging results.

3.2 COMMENTS FROM ARCO

The following are responses to ARCO's August 9, 1996 comments to EPA's Community Soils Proposed Plan, including responses to referenced comments specific to ARARs, the Final Baseline HHRA, and the Community Soils RI/FS. All ARCO comments are attached.

Comment A: "Based upon ARCO's work on the Community Soils OU RI/FS, Alternative No. 3 In-Place Treatment, Capping and IC's meets the requirements of CERCLA and the NCP, and is preferable over Preferred Alternative No. 4 identified in the Proposed Plan... Yet EPA identifies Alternative No. 4 as the Preferred Alternative on the basis that 'the removal option is a more proven, protective and permanent remedy that is readily implementable and cost effective.' The Proposed Plan provides no basis for EPA's conclusion and the administrative record does not support this conclusion."

Response: In the Feasibility Study, EPA, through its formal comment, rated the relative performance of each alternative with respect to 7 of the 9 National Contingency Plan (NCP) criteria. Alternatives were rated to have an advantage (+) or disadvantage (-) when compared to other alternatives. A zero rating (0) is applied to an alternative having no distinct advantage or disadvantage over the other alternatives. In the ROD, EPA has rated the residential soil alternatives against all nine criteria as shown in Table 12 of the ROD.

Of the residential soil alternatives presented in the ROD, only Alternatives 3 and 4 are fully protective of human health and the environment and, thus, discussed further. Alternative 4 reduces residual soil arsenic concentrations to a greater degree than Alternative 3 (clean soil vs. treated soil). Both Alternatives offer permanent and irreversible actions. Alternative 3 employs treatment, Alternative 4 does not. Both Alternatives are readily implemented, have similar short-term impacts, and are cost effective.

Both Alternatives would require invasive actions in residential yard areas. Alternative 4 would require additional action to bring in clean soil. Alternative 3 is estimated to cost less than Alternative 4, although the cost differences are not considered significant. However, sufficient uncertainties exist with Alternative 3 in regard to the cleanup effectiveness, cost, and implementability issues with in-place treatment of residential areas. Additional treatability studies would be required to demonstrate the performance of this alternative in meeting the criteria. Conversely, removal actions, conducted in residential areas, have proven that the criteria can be met.

In comparing the relative performance of all criteria (ROD, Table 12), Alternative 4 has a slight advantage over Alternative 3. However, important differences, listed below, between the two alternatives have lead EPA and the State of Montana to strongly prefer Alternative 4.

- Alternative 4 provides the greatest level of protection and best approaches EPA's 1E-06 risk point of departure and the State of Montana's general goal of protection from environmental carcinogens at 1E-05. Note that although the relative performance rating for overall protection of human health and the environment was the same, the differences described above in regard to a threshold criteria can be significant.

- Alternative 4 utilizes a proven technology. Although soil treatment under Alternative 3 has been demonstrated in reducing relatively high concentrations to moderate levels in large areas using large equipment, it has not been demonstrated to be effective for low concentrations, in confined areas using smaller equipment. Sufficient uncertainty exists with the implementability, effectiveness, and cost of Alternative 3.

- Cost differences between Alternative 4 and 3 are not significant in comparison to the benefits described above.

Comment B1: "ARCO also contests the 250 ppm residential soils action level for arsenic identified in the Proposed Plan....ARCO requests that EPA raise the residential soils action level for arsenic for the Community Soils OU to at least 297 ppm arsenic."

Response: The Final Baseline HHRA was conducted according to EPA guidance utilizing site-specific data to the maximum extent practicable. Default assumptions and professional judgement were also used throughout the exposure assessment to estimate potential chronic daily intakes (CDI). Data were not available to determine quantitatively how each of these assumptions and judgements might influence CDI calculations. However, as discussed in the risk assessment, urinary arsenic concentration predicted using the basic assumptions also used in the exposure assessment are in good agreement with those actually measured in the community of Anaconda. This suggests that assumptions and judgements made are reasonable and uncertainty in the results of the exposure assessment is relatively small, at least for young children.

It should also be noted that uncertainties in exposure assumptions not directly assessed by the comparison of observed and predicted urinary arsenic in children are not expected to greatly influence exposure estimates. As discussed in the Final Baseline HHRA, factors such as soil/dust ingestion rates for adults, and exposure frequency and duration, are at least conservative (i.e., are unlikely to underestimate possible exposures) and probably do not result in substantial overestimation.

It is reasonable to conclude that exposures calculated in this assessment are acceptable for calculating risk.

Section 300.430(e)(2) of the NCP (pp. 8716) requires that remedies are selected that reduce the threat from carcinogenic contaminants at the site such that the excess risk from any medium to an individual exposed over a lifetime generally falls within the range of 1E-04 to 1E-06. EPA's preference, all things being equal, is to select remedies that are at the more protective end of the risk range. Therefore, when developing its preliminary remediation goals, EPA uses 1E-06 as a point of departure. Preliminary remediation goals for carcinogens start at the point of departure, but may be revised to a different risk level within the risk range based on consideration of appropriate factors including, but not limited to: exposure factors, uncertainty factors, and technical factors.

As discussed above, EPA believes that individual residential areas or hot spots within the Community Soils OU may pose an unacceptable risk. EPA also believes that the exposure estimates, considering uncertainties, calculated in the risk assessment are reasonable. Therefore, the range of screening levels (3 ppm to 297 ppm), that were developed for the targeted risk range of 1E-04 to 1E-06 in the risk assessment, are considered to be the appropriate range from which to select an action level for remediating hot spots.

First, EPA determined that the appropriate exposure area of a residential hot spot is the residential yard. The residential yard was chosen for the following reasons:

- Yards are an appropriate remediation management unit (i.e., property ownership);

- It is consistent with previous removal and remedial actions taken by EPA;
- It allows for consistent remediation of community and rural residential areas;
- Yards are defined as the unit to be addressed under the Anaconda-Deer Lodge County Development Permit System; and
- It is not unreasonable for an individual to remain in one residence for a long period of time, even a lifetime.

EPA then determined the arsenic action level for residential surficial soils to be 250 ppm. This corresponds to an excess cancer risk of 8E-05 and is within EPA's targeted risk range. Although the 250 ppm action level departs from EPA's 1E-06 point of departure, this action level is determined to be protective for the following reasons:

- The 250 ppm action level reflects detailed site-specific studies conducted in Anaconda that significantly reduce the uncertainty of the risk assessment. These studies provide site-specific parameters to replace standard EPA default assumptions, which generates a greater degree of confidence in the range of screening values.
- The range of screening values were developed from conservative exposure point concentrations in the Final Baseline HHRA. Samples collected for the Final Baseline HHRA were chosen from areas likely to contain elevated concentrations, not a random average of a particular area. These data potentially elevated exposure point concentrations adding conservatism to the calculated screening values.
- The 250 ppm action level is applied to a much smaller exposure unit than those evaluated in the Final Baseline HHRA. Although the excess cancer risk (8E-05) for the 250 ppm action level is greater than the existing risk range for the subareas (1E-05 to 3E-05), it is applied to a much smaller exposure unit than the subareas that were evaluated in the Final Baseline HHRA. This significantly decreases the chance of averaging out a higher concentration value within a yard as compared to the larger subarea.
- Cleaning up hot spots in excess of the 250 ppm action level is expected to reduce the overall risk in each subarea and the entire community of Anaconda to close to 1E-05 which approaches EPA's 1E-06 point of departure and the State of Montana's general goal of protection from environmental carcinogens at 1E-05.

In addition to the above, risk management considerations included the following:

- a 250 ppm action level was previously utilized in a removal action taken under the Community Soils OU;
- A 250 ppm level is currently utilized in the Anaconda-Deer Lodge County Development Permit System; and
- The 250 ppm action level incorporates a balancing of the NCP criteria used to select remedial actions that are protective, implementable, and cost effective.

Comment B2: Incorporated by reference are ARCO's comments dated December 1,1995 (attached)

Response: 1. Arsenic Toxicity

The derivation of the oral cancer slope factor for arsenic is a controversial topic which is well represented on all sides. Section 5.3.4 in the Final Baseline HHRA (CDM Federal 1996) for Anaconda attempts to present all of those issues and uncertainties in an objective manner. The 1995 paper by Mushak and Crocetti has

been published in a respected peer-reviewed scientific journal and adds a much needed perspective to those issues. The reference will not be removed.

2. Lead Exposures

The Final Baseline HHRA (CDM Federal 1996) for Anaconda evaluated the soil and dust ingestion study performed by Dr. Calabrese. The mean soil and dust ingestion rates range from 83 to 117 mg/day depending on which tracers were looked at. The integrated Exposure Uptake/Biokinetic (IEUBK) model utilized default soil and dust ingestion rates ranging from 85 to 135 mg/day depending on the age of the child. EPA felt that the findings in the site-specific soil/dust ingestion study supported the values used in the IEUBK model and, given the analytical variability in the study, did not merit a revision of those values.

Although results form Dr. Calabrese's reevaluation of the Anaconda data were not submitted to EPA, we are still very interested in receiving those. As indicated in earlier discussions, EPA will consider the revision of the soil/dust ingestion rates used in the Final Baseline HHRA based on those new data. Until then, the existing data does not suggest, with any certainty, that the IEUBK default soil ingestion rates exceed site-specific soil ingestion values.

3. Discussion of Lead and Arsenic Toxicokinetics

EPA agrees with these comments and has incorporated them into the Final Baseline HHRA for Anaconda.

Comment B3: "The purpose of [ARCO's February 29, 1996] letter is to provide EPA with a risk-based derivation of a cleanup level that would be appropriate to apply to individual yards in Anaconda....If it is necessary for EPA to establish a cleanup level that could be applied to an individual yard, the yard cleanup level should reflect the time spent elsewhere in the community...For these reasons, we believe that the cleanup level for an individual yard should be set at 400 ppm."

Response: See previous comment in regard to the selected action level. EPA has decided that the yard is an appropriate exposure area and was chosen for the Community Soils OU for the following reasons:

- Yards are an appropriate remediation management unit (i.e., property ownership);
- It is consistent with previous removal and remedial actions taken by EPA;
- Allows for consistent remediation of community and rural residential areas;
- Yards are defined as the unit to be addressed under the Anaconda-Deer Lodge County Development Permit System; and
- It is not unreasonable for an individual to remain in one residence for a long period of time, even a lifetime.

Comment C: "...the ROD should expressly state that remedial action at the Community Soils OU will be undertaken upon a private landowner's property only at the request of the landowner. Additionally, the ROD should specify that remediation will only occur in residential areas within the Focus Areas that are not already adequately covered with lawn, vegetation or other appropriate protective barrier."

Response: EPA recognizes the property rights of land owners and will work with them to implement the remedial action as appropriate. Individuals within the Focus Areas will be contacted for access to sample with possible remediation of soils to follow. Landowners will be encouraged to participate. If specific yards are not sampled or remediated, EPA will not be able to declare their property as clean or remediated. These properties (and cleanup status) would be tracked within the

County's data base for future access to realtors or others interested in the property.

Property owners outside the Focus Area will not be contacted by EPA. Instead, general information will be distributed within the community through the CPMP, suggesting that individuals who believe a problem may exist on their property contact EPA through the county to request participation in the remedial action.

All properties within the Focus Areas will be included in the remedial action regardless of existing cover. In addition to addressing current exposure to elevated arsenic concentration, EPA is required to address future exposure as well. Because certain barriers may not be permanent or remain effective over time, contaminated soils below the barriers may become exposed in the future. In addition to sampling for soil arsenic concentrations, EPA will evaluate the adequacy of existing barriers and any associated ICs (i.e., use restrictions, maintenance, etc.) before determining which soils require remediation.

Comment D: "EPA should utilize ARCO's ARARs Clarification Document, or a subset thereof, as the final ARARs for the Community Soils Remedy Selected in the ROD."

Response: EPA believes that its selection of ARARs is rational and based on sound judgement. As ARCO knows, remedial actions must be protective of human health and the environment and must meet ARARs. See 40 C.F.R. § 300.430(f)(1)(I)(A). ARCO seems to argue that because the ARARs in this instance may result in a cleanup slightly more conservative than the analysis that determines how to protect human health might require, the ARARs listing is somehow flawed. But the NCP makes clear that a remedial cleanup must not only be protective of human health, it must meet all ARARs requirements unless those ARARs are waived.

Comment E: "Remediation of surface water, groundwater, air and other media than soils and railbeds is outside the scope of this Operable Unit and ARARs should not be identified for these media."

Response: EPA agrees that remediation of these media is outside the scope of the Community Soils OU. However, ARARs for these media are outlined in connection with this OU for two reasons. First, these ARARs must ultimately be met at the completion of remedial work for the Anaconda Regional Water, Waste, and Soils (ARWWS) OU. These ARARs are mentioned here in order to promote consistency between the Community Soils and the regional Water, Waste, and Soils cleanups. Second, although these ARARs are outside the scope of this OU, it is always possible that actions at the Community Soils OU could independently violate these ARARs. These ARARs are therefore retained as a reminder that they must be complied with in carrying out response actions at this OU.

Comment F: "There is no need for EPA to identify all possible federal and state requirements as final ARARs in the ROD in order to ensure a protective remedy."

Response: It is assumed that ARCO's comment concerning the need for flexibility has to do with the reclamation ARARs, M.C.A. § 32-4-201 and following, and regulations promulgated thereunder, identified by EPA. EPA agrees that all reclamation ARARs identified are not necessarily relevant and appropriate for each area to be remediated as part of this OU. For example, A.R.M. § 26.4.502 governs how slopes are to be reclaimed. If a parcel such as a flat residential yard is being addressed, an ARAR dealing with slopes is obviously not pertinent. If a particular ARAR does not make sense in a particular situation, it will not be applied. Thus, EPA believes that there is adequate flexibility built into the process of selecting and applying ARARs and developing performance standards without dropping certain reclamation ARARs from the ARAR listing.

Comment G1: "ARCO incorporates by reference its disclaimer letter (August 9, 1996, attached) on the RI/FS."

Comment G2: "EPA did not prepare a complete rewrite of the RI/FS, and no complete rewrite was required."

Response: The context of EPA's July 30, 1996 letter was in regard to the ARWWS OU and not the Community Soils OU. In that regard, the regional soils portion of the January 16, 1996, draft Community Soils RI, prepared by ARCO, did not provide sufficient detail to characterize the fate and transport of soil contaminants to other media (i.e., surface and groundwater). It was EPA's intent (as conveyed in the Soils RI outline and scoping meetings) to use this RI to fulfill all characterization needs of both OUs. Subsequently, it was determined that separate RIs would be required for the regional and community soils components. The Community Soils RI subsequently deleted the regional fate and transport information. Soil characterization information was then provided in a separate Soils Characterization Report to support both RIs. These changes, in EPA's opinion, were construed as a major rewrite.

EPA agrees, with the exception of above, that most other portions of the Community Soils RI/FS were provided as directed. However, most of these sections required extensive editorial revisions to provide sufficient detail to support the technical discussions in the document. ARCO has made all requested changes, to date, in a satisfactory manner.

Comment H1: "Kriging method[s] EPA required were unnecessary and overly conservative... ARCO's first round of kriging was in accordance with generally accepted methodologies..."

Comment H2: "ARCO contests the use of relative kriging EPA required in the third round [of kriging effort], the required use of faulty DOJ software package in the 2nd round,

and the use of 250 ppm arsenic action level [to establish the number of residential blocks exceeding the arsenic level]."

Response: The semivariogram and associated kriged maps for arsenic and metals for Anaconda, Opportunity, and Regional soils were completed in early 1996 by ARCO's subcontractor, Advanced GeoServices Corporation (AGC). This work was completed using log transformed data applied to ordinary kriging procedures. As stated in the first paragraph of Section 3.3 in volume II of the Final Draft Community Soils OU RI/FS Report (July 3, 1996), "Kriging can be performed on log-transformed data sets; however, when the kriged results are back-transformed, the biases that are introduced make it impossible to accurately calculate confidence intervals." Accurately calculated confidence intervals are critical in determining the overall quality of the kriging effort. Both AGC and EPA were concerned about this technical limitation, but neither party knew of a solution. This problem was most apparent on kriged maps were arsenic levels were bounded by very large upper and lower 90% confidence limits.

Subsequent discussions with Dr. Rex Bryan (EMSI, a Department of Justice subcontractor) revealed that general relative kriging procedures could be applied to the soil data and associated calculation of confidence limits on estimated kriged values could be performed in a correct and logical manner. Software believed to contain general relative kriging was provided to AGC for a trial run. The trial run resulted in a kriged map with 90% confidence intervals as large as those using ordinary kriging. Subsequent discussion with Dr. Bryan revealed that the incorrect software had been provided which did not contain general relative kriging. He apologized for this error and confirmed that general relative kriging procedures were available in software previously obtained by AGC from Dr. Peter Knudsen (Montana Tech). Geostatistical software developed by Dr. Knudsen had been used by AGC to do ordinary kriging and this software also contained general relative kriging procedures.

At this juncture, AGC applied general kriging procedures to the Anaconda, Opportunity, and Regional arsenic data and the Regional lead, copper cadmium and zinc data. The resultant 90% confidence intervals were much

improved and overall results were very satisfactory. These products appear in the Final Draft Community Soils OU RI/FS Report (July 3, 1996).

With respect to ARCO's assertion that the kriging was overly conservative, although a statistical comparison of blocks exceeding the arsenic action level as a function of either ordinary kriging or general relative kriging was not performed, EPA believes this statement to be incorrect. In fact, EPA believes that the opposite is true; that is, the number of residential blocks exceeding the arsenic action level is less with the general relative kriging used in the Final Draft Community Soils RI/FS. The upper 90% confidence limit on estimated kriged values had notably lower arsenic concentrations at many locations, compared to those attained with ordinary kriging. If the upper 90% confidence interval were used, this would identify fewer blocks that exceed the action level.

With respect to ARCO's assertion that relative kriging does not comport to generally accepted methodologies, general kriging is the standard of the industry. Unfortunately, neither EPA nor AGC had this knowledge at the time of the first round.

With respect to ARCO's contesting the use of relative kriging, general relative kriging is the correct application of geostatistics to the soil data. ARCO's contractor (AGC) recognized the problem associated with application of ordinary kriging procedures but did not know how to institute a solution. If ARCO had contracted a company that had more experience with such data sets, this redo of the kriging work could have been avoided. If AGC had pursued the problem in greater depth (e.g., consulted with other geostatistical professionals), this problem could have been avoided. Instead, the undesirable characteristics of the first effort were only revealed upon review of the kriged map, and EPA oversight identified an alternative to solve the problem.

With respect to ARCO's contesting the use of faulty DOJ software, this scenario is explained above and was unfortunate. Neither EPA or AGC were familiar with general relative kriging. Therefore, it was not apparent that the software provided by Dr. Bryan was an error.

With respect to ARCO's contesting the use of 250 ppm estimated arsenic to identify the number of residential blocks exceeding the action level, only three additional blocks were added (for a total of 12), discounting the Teresa Ann Terrace blocks and the two recreational and commercial blocks. The discounted blocks are described away as non-residential in the text of the RI/FS, but are retained on the map to honor the results of the kriging effort.

Comment I: "No technical or risk-based justification exists for determining 250 ppm arsenic as the residential soils action level."

Response: See EPA's response to ARCO comment (B) above.

Comment J: "EPA arbitrarily modified the ranking of alternatives in the final screening of alternatives."

Response: See EPA response to ARCO comment (A) above.

Comment K: "Previously reclaimed areas and recreational areas should not be included in the Focus Areas in the RI/FS."

Response: According to the Community Soils OU RI/FS Work Plan, "the scope of the RI/FS is to evaluate all residential areas within the Anaconda Smelter NPL Site. These areas generally include the communities of Anaconda, Opportunity, Warm Springs, Galen, and Fairmont, but also include adjacent rural residential dwellings. Areas of concern within the communities include yards or "dwelling areas". The "dwelling area", as defined by the ADLC-DPS, is the area within a 100-foot radius of the approximate center of a residency. In addition to dwelling areas, areas frequented by children within the communities (i.e., playgrounds,

school yards) will also be evaluated. In addition, this RI/FS will also address potential future residential areas as defined in upcoming revisions to the ADLC Master Plan. Potential source areas within the communities will also be evaluated. These include railroad beds, areas where street sweepings were disposed, suspected waste/fill areas, alleys, etc." In addition, comments provided during the Public Comment Period resulted in EPA also including commercial/industrial areas within this action.

Therefore, the scope of this remedy is current and future residential areas within the Anaconda Smelter NPL Site, which includes parks, playgrounds, school yards, commercial/industrial areas, and railroad beds within communities.

The intent of this remedial action is also to bring closure to previous residential cleanups which were conducted either with removal actions or through the ADLC-DPS. Closure of areas previously remediated or reclaimed would be primarily administrative to ensure that previous actions are consistent with this final remedial action.

Use of the Focus Areas in the Selected Remedy is for the purpose of prioritizing remedial actions only. The intent of the original scope of the Community Soils OU as well as the Selected Remedy is to address all of the above "areas" that are within the Anaconda Smelter NPL Site that exceed the appropriate action level. An area by area evaluation will be required during the Remedial Design (RD) to identify the specific locations that require remediation. Consideration will be given in the RD to sampled arsenic soil concentration, current and reasonably anticipated landuse, existing barriers, ICs and landowner input.

Comment L: "Cleanup Actions for Current and reasonably Anticipated Future Residential soils must be limited to specified residential areas that are within the Focus Areas in Figure 2 and 3 of the Proposed Plan."

Response: EPA disagrees with this comment. (See EPA's response to ARCO Comment K above).

Comment M: "Funding procedures for cleanup of future residential areas should be in accordance with procedures specified in the CPMP and the DPS and should not be specified in the ROD."

Response: EPA agrees that funding requirements should not be specified in the ROD. However, the funding procedures will be determined during RD and should not be assumed to be the CMPS or DPS. EPA encourages ARCO to continue its efforts with the county to develop adequate and fair funding procedures.

Although it is EPA's desire to use ICs to remediate areas both in the near and far future, it is also EPA's intent to ensure that those ICs do not divert remediation responsibilities to individual landowners.

Comment N: "No preference should be given to removal of soils at future residential areas."

Response: EPA's intent is to apply the residential soils remedial action in a consistent manner to all current and future residential areas within the site. In order to utilize existing ICs, this includes requiring a preference for removal under the ADLC-DPS. As stated in the ROD, EPA is aware that removal may not be possible in all situations, whether it is current residential areas under the remedial action or future residential areas under the DPS. In those cases, other methods will be utilized to reduce soil arsenic concentrations.

Comment O: "ARCO concurs with EPA that risks to human health within the Community Soils Operable Unit are below levels of concern."

Response: Although risks to the communities are generally below levels of concern, kriging estimates and actual data suggest that there may individual yards that have soils arsenic concentrations that are above the selected action level, and will therefore require remediation.

Comment P: "The "Designated Soil Management Area" should be identified in the ROD as the ADLC Designated Soils Repository."

Response: The ADLC Designated Soils Repository was specifically not mentioned to allow some flexibility for utilizing removed residential soils at other locations within the Anaconda Smelter NPL Site. However, EPA does agree that the ADLC Designated Soils Repository may well be the primary disposal location.

Comment Q: "ARCO generally supports the Preferred Alternative for the railroad beds."

Response: EPA acknowledges this comment.

Comment R: "ARCO does not admit and reserves its right to contest the statement in the Proposed Plan that "railroad beds [were] constructed primarily by a subsidiary of the Anaconda Copper Mining Company, in Anaconda and regionally." Additionally, the Proposed Plan speculates that railroad beds were likely constructed from materials from the Anaconda or Butte mining/smelting operations, again without basis."

Response: There is considerable historical information indicating that the Butte, Anaconda & Pacific Railroad, which built and operated many if not all of the railroad beds addressed in this action, was closely associated with and controlled by the Anaconda Company and its predecessors in various ways. Railroad bed material appears to be waste material from smelting and mine processing in part, and is likely contaminated with materials transported from Anaconda Company mines to the Anaconda Smelter. The likely source for the smelting and mine processing waste materials is the Anaconda Company or its predessessor's facilities in Anaconda or Butte.

4.0 REFERENCES

AGC. 1996. Community Soils Operable Unit Remedial Investigation/Feasibility Study, prepared for ARCO by Advanced GeoServices Corporation. This document also contains the Soils Characterization Report as Appendix A.

CDM Federal. 1996. Final Baseline Human Health Risk Assessment, Anaconda Smelter NPL Site, prepared for EPA by CDM Federal. January 24.

Peccia & Associates. 1992. Anaconda Deer Lodge County Comprehensive Master Plan, prepared for the Anaconda-Deer Lodge County Planning Board by Peccia & Associates and Lisa Bay Consulting. December 1990. Revised June 1992.

Attachment A

Transcript of Formal Public Meeting

PUBLIC HEARING

ANACONDA COMMUNITY SOILS OPERABLE UNIT

TRANSCRIPT OF PROCEEDINGS

Taken At:

Anaconda High School

Anaconda, Montana

July, 18, 1996

CHARLES COLEMAN, EPA Project Manager, presiding

NORDHAGEN COURT REPORTING
CANDI NORDHAGEN
1734 Harrison Avenue
Butte, Montana 59701
(406) 494-2083

Registered Professional Reporter
Conference room
1734 Harrison Avenue

PUBLIC HEARING

ANACONDA COMMUNITY SOILS OPERABLE UNIT

TRANSCRIPT OF PROCEEDINGS
Taken at:
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July 18, 1996

<IMG SRC 0896127MM>

ANACONDA COMMUNITY SOILS OPERABLE UNIT
JULY 18, 1996; ANACONDA, MONTANA

BE IT REMEMBERED THAT a formal public hearing was held at the Anaconda High School, Anaconda, Montana, on July 18, 1996, Charles Coleman, EPA Project Manager, presiding.

The following proceedings were had:

MR. COLEMAN: We might as well get started. I appreciate folks coming in, giving up a summer evening to be with us today. I know it kind of would be hard to drag myself in if I had something going on.

My name is Charlie Coleman. I'm Project Manager, EPA Project manager of the Community Soils Operable Unit.

Tonight we want to discuss the proposed plan that was recently published for the Community Soils Operable Unit. We have a pretty full agenda tonight. We want to try and accomplish a lot of things here. As you can see, we brought some materials with a lot of information. We've placed some information at the Hearst Library and up at the

county courthouse.

What I'd like to try to do tonight is is summarize a little bit some of the more technical information we have available and answer any questions you might have on that, answer any questions that you might have in regard to the preferred alternative or any other questions that you might have tonight; and then lastly, actually give you guys an opportunity to formally provide testimony or a formal comment on the record that we would include in our final decision document. This is just another opportunity or means to give the public an opportunity to participate in the Superfund process, both from a written standpoint and an oral standpoint.

This public participation process is kind of provided under the Superfund law and it really is important. This is your opportunity to kind of get involved in some of the work that we've been doing. It's in your community, in your neighborhoods, in fact. We want to be available and give you every opportunity to provide comment.

Currently, we're in a public comment period that lasts until August 9th. As I mentioned,

there is the complete remedial investigation or the study that we've conducted with all the information, and a feasibility study which is really our evaluation of the different types of alternatives that were considered in arriving at our preferred alternative.

In addition, there are copies of the proposed planned. I'm not sure whether everybody here has had an opportunity to receive an individual copy. I believe we have some tonight to pass out to you or take if you would like. If not, there should be copies at the Hearst Library and up at the courthouse. Please get one of those. And again, it's an opportunity to provide some comment on those.

When you're providing comment, whether it's tonight or in writing to the agency, all of the information contained in the reports or in the proposed plan is fair game to comment on. We're looking for support of our preferred alternative or criticism against it.

If you review some of the other alternatives and you think they are better, we want to hear that, or maybe you have a whole different idea of how we should be addressing problems here.

All of that we'd like to hear from you. And if you do take the time to either write those comments down or speak those out tonight, they will be formally addressed back to you individually and also be a part of the Record of Decision, which is what we do after this public comment period, make our final decision on the alternatives that we're talking about tonight.

I believe when you came in here, there was kind of a comment sheet, if you want to just make notes as we talk tonight, keep track of any comments or questions you might have. Also, if you want to take this, write your comments on this, and send it in. Again, we're trying to mmmake things easy to be able to get that information back to the agency.

In addition, there's several of us here tonight and available to answer any questions. I believe on your hand-out packet at the back there's my name and phone numbers available. Also with us tonight, Julie DalSaglio is the other EPA Project Manager on the Anaconda site. She's working on the Anaconda regional water wastes and soils - there she is in the back over here - some of the other work that's going on. And if you have questions in

regard to that, you might stop her here tonight.
    Also, Andy Young, State Project Officer, is here as well, and we have some various other people; Pam Hillery, our Community Relations Specialist. Feel free to stop us tonight, ask questions.
    Again, there's some posters up here that show some information. Feel free to look at those and grab any one of us to answer any your questions.
    Also here in the third -fourth row here are some folks that are actually working for you here in Anaconda as part of the technical assistance grant that EPA has provided to community through the Arrowhead group: Meg, Don and Todd, Todd and Don, those three right here are in a sense available to review technical information and try to answer questions for people. They are located down at the ALDC. Where is that at?
    UNIDENTIFIED SPEAKER: 118 East 7th, Community Services Building.
    MR. CHARLES COLEMAN: And your phone number?
    UNIDENTIFIED SPEAKER: 563-5538.
    MR. CHARLES COLEMAN: These people are available to maybe help sift through some of the

more technical information that's at the library and also act as a go between. If you had a question and would rather talk to them, see if they can answer it, that is great. If they can't, they're going to call me and we'll definately try to get that information back to you. So if they're another resource here for you that's in your community.

I think I'll just jump into this. I guess with the size of the crowd we have here tonight, if I'm going over something that you don't quite understand, raise your hand; or if it just doesn't make sense, I'll try to stop and maybe explain it a little bit better. I'm going to try to go through a lot of information very quickly so we can talk about the alternatives a little bit. But I do want to try and address any of your concerns. We have kind of a question-answer period kind of built into this, but feel free to stop me as I go along here and see if we can get all the questions answered.

The Community Soils Operable Unit, that's the project we're working on, is one of only two that are remaining here at the site. The other that Julie's working on I mentioned, Anaconda Regional Water, Wastes, and Soils - it has a long

title because it has lot of stuff in it - really deals with all the remaining issues at the site here including groundwater, surface water issues, deals with all the big waste sources that we still have at site, Anaconda-Opportunity Ponds and slag, Smelter Hill, and all the non-residential soils.

This project specifically deals with residential soils throughout the entire Superfund site. This overhead here generally shows kind of the area that we have evaluated during the course of this project.

One of these overheads should be -- or all of these overheads should be in your packet of information. I may not cover all of them. If you see something that I didn't cover, again, stop me and I can put that up.

The Community Soils Operable Unit, as I said, deals will all residential areas, whether they're within the communities of Anaconda Opportunity, Warm Springs, Galen, Fairmont, but also addresses any of the adjacent rural properties that are out there. Within the communities, we generally look at a yard as a residential soil, but within the communities, we also want to address through this project any parks, schools, playground areas

where children might frequent.
In addition, as I mentioned, Julie was working on a lot of these other waste sources. We are, under this project, trying to deal with any waste sources that might again be within the limits of the community. That's why this particular project deals with the railroad beds that run through the community of Anaconda and/or may deal with any other materials that may have been imported at sometime in the past.
That kind of gives you a scope of what this project is about. Thorough this project, we hope to also bring closure to any previous activities that dealt with residential areas like we did at Teresa Ann Terrace and Cedar Park Homes. So this would hopefully bring closure to those areas as well.
The investigation that we did really centered on three main areas within this project: Characterization of Soil, primarily within the communities; a characterization of risk through our risk assessment process; and identification of where people might be living or people might live in the future through an assessment of future land use.
I think just I'll maybe briefly talk

about the results of those. I have a lot of overheads that deal with some of the results. In your packet, there's some summaries of soil-sampling information. I think I will just briefly discuss those in terms of what was kind of a compilation of the data that was collected throughout the site and gives an average, minimum-maximum. It's there for your information.

What we did, there's been soil data collected at site for almost ten years and we had literally thousands of data points. What we wanted to do was characterize the soils is basically take all that information and then estimate soil concentration where we didn't have data.

We used a computer process called "kriging" to do that. Some of you have already stepped up and looked at some of these maps, a bunch of squares and a lot of little numbers in them. We did that both on a regional basis, it looks like a jigsaw puzzle, and we did that for communities of Anaconda and Opportunity.

Because there was some questions about what this is, this is a quick example, a crash course on kriging here, but what we tried to do is we had some data points, actual data points that

were collected by sampling out there. We wanted to try to be able to estimate concentrations throughout the area.

This process allowed us to take actual data points and estimate what a concentration might be in any particular area at the site. The middle number is what we would consider a best estimate of what's represented within that grid cell. And the upper and lower numbers are kind of the upper and lower bounds. And again what that would mean is if you collected data, the chances are the estimation or the actual concentration should fall between the upper and lower limits of those numbers there.

As you can see, in some cases there's quite a bit of variability between that upper and lower limit. I guess the main thing I wanted to mention on this is that in those areas where you don't have actual data and in cases in the community where unless we were actually in your yard, all we're really doing is estimating a likelihood of a concentration in those areas. To really be sure whether the concentration is there, we would need to go back and actually sample to find that out.

UNIDENTIFIED SPEAKER: What is each number for? The 140, is that the arsenic?

MR. Coleman: I'll use that as an example. In this grid here, even though there was one sample collected at 119, based on not only that data point but some of these other data points, we would estimate the concentration. If you were to go out there and just take another sample, that it would be very near 140.

UNIDENTIFIED SPEAKER: Is that for arsenic?

MR. Coleman: For arsenic, that's true.

UNIDENTIFIED SPEAKER: What are the other numbers?

MR. COLEMAN: They're all for arsenic. The upper number is basically, if I took a sample on this grid, it should not exceed 170, and generally would not be below 110, if I choose a representative soil sample. That's kind of what that, in a nutshell, really means.

Now, having said that, within the communities, some of that you can throw out the window because as folks know here, you people bring in sod for soil and they do different things in their yard. So again, it's an estimation of a few data points to what might be there, but because we know people do a lot of different things, it may not

actually represent what's in your particular yard.
If you get a chance to look at this, these orange squares here kind of represent higher values. It doesn't necessarily mean all these values are bad or anything. It just says, again, based on all these squares here, we asked the computer to tell us where the highest 25 percent of the values are, and it kind of shows in this area.
The Smelter stack would have been located somewhere in this direction here. And the only thing I want to point out from an overall standpoint is that consistently, we kind of see this pattern of elevated metals or concentrations in the area, kind of approximate some of the wind patterns in there, we see a lot around Smelter Hill kind of going out kind of towards Warm Springs. This is generally the area we see more elevated samples.
We didn't find very high samples in the other communities like Opportunity, Warm Springs, Galen, and Fairmont. We did see some, as shown on the Anaconda map, we did see some more elevated levels in the eastern part of the community. So in a sense, those areas were kind of the areas we ended up focusing on.

Also as part of this investigation, we did quite extensive risk characterization on human health. Some of you here may have actually been involved with the University of Cincinnati arsenic exposure study. But they came and actually evaluated hundreds of families her in the community.

And the basic result of that study showed that although there may be some elevated levels of arsenic in the community, the connection or the exposure that was being measured was very low, which is good. In fact, Anaconda was near normal in terms of the type of exposure to arsenic that you would see in other places around the county. So that was good. That was actually a more of a snapshot or a picture of what actual exposure people were receiving in the community.

In addition to that study, we've had studies - and again most of these were sponsored by ARCO - we had a study that was conducted by the University of Massachusetts that looked at soil ingestion. And what they were trying to measure is actually the soil that actually might be ingested via hand-to-mouth activities and things like that.

We also looked at a study that looked

at arsenic bio availability. And what that is, is if arsenic gets in your body, how much of it actually gets absorbed into the body or into the blood. That study was done down in Colorado using monkeys. All of that data that was collected from the studies was used by EPA to conduct a risk assessment.

Our risk assessment differs from those studies. They are looking at actual risk, actual ingestion rates, and bio availability. The EPA's risk assessment actually tries to predict a potential risk using somewhat conservative numbers so that we're protective in our estimates.

We calculated risk to residents within Anaconda and Opportunity. And our results basically indicated that the risk levels were generally below our level of concern, which was real good news. All the studies that were conducted and even EPA's risk assessment generally indicated that risks in this area were fairly low.

However, we still had a concern that there may be individual areas out there, individual yards that may have elevated, you know, maybe more elevated metals that for that particular individual may create more of a risk.

From that, we needed to kind of bring an end point to what is elevated and what is okay, so we wanted to propose an action level for arsenic here for Anaconda. This is just a little diagram to kind of put this in perspective. EPA's what we would consider an acceptable risk range for excess cancer risk in the community ranges between 3 and 300. Background, based on some earlier studies, was down in this range of 6 to 16. However, based on some of the data that we've collected since, a more natural background is probably anywhere from 50 to close to 100. We just see those values everywhere.

We were kind of already up here. What we ended up doing was choosing 250 parts per million, or were proposing 250 parts per million as kind of the action level. It is at the upper end of our risk range but because of all the data that was collected and all the studies that were done, EPA feels really good that the 250 number is a very protective number to establish a risk action level for.

Also on this, it does show the average, what the average concentrations we found both within Anaconda and Opportunity. So average concentrations already kind of fall below our action level. Again,

what we're emphasizing here is that we're looking for those individual areas or yards that may exceed the 250 parts per million level.

Those areas are kind of shown on this map. What this map is, those areas that we are calling residential or future residential or potential residential areas and exceed 250 parts per million are shown up as being shaded. Again, they approximate kind of where we see the more elevated metal concentrations. The blank areas are excluded. There's Smelter Hill, Opportunity Ponds and some areas that we believe to be dedicated for primarily agricultural use.

So generally, there's some areas to the north and to the northeast that are kind of being included in what we're calling the focus area and some areas to the southwest in the Aspen Hill - Clear Creek area of the Mill Creek drainage that, again we're predicted based on data collected, that these areas might be greater than 250 parts per million and then thus exceed our action level

UNIDENTIFIED SPEAKER: I've got some property between Lost Creek and Warm Springs Creek by the old drag strip. They came up and were taking the sample. I have been hauling manure in there for

a year and a half trying to get something to grow. That's where they took the sample where I have been neutralizing it for well over a year and a half. That's where they took their sample from my property. Some of it is nothing but rocks. You can't get nothing to grow there. They wouldn't take a sample there.

MR. COLEMAN: Generally, unless you brought in clean soil, when you sample for metals, since metals can't be created or destroyed, they still should pick up the metals in those areas.

We are and will continue to collect data to evaluate areas. And I think based on this, showing this as a focus area, what we would likely do is in those areas where a person is living and has a yard, we would still want to come back and sample those areas and make sure that you're either below 250 or above.

So again, this is an estimation. It does match up pretty well with other data that we collected. So we feel that it is pretty accurate to at least give us a starting point to look at different areas.

Then like I said, we did focus, we also looked at the community of Anaconda. And when we

did the same thing, we had relatively few areas that based again on our estimation actually would exceed the 250 parts per million proposed action level in this southeastern part of Anaconda and in the eastern part.

Some of these blocks on the far east are primarily outside the residential area. Some of them, I think, border Benny Goodman Park and aren't necessarily included. I did want to also mention that also in the proposed plan, we did have some areas in the Teresa Ann Terrace. They are probably being impacted. Those blocks were included because they were being impacted by samples outside of that. Since we have already taken a removal action at Teresa Ann Terrace at the 250 parts per million level, we really don't believe that this is an area of concern for our focus area. So on this map, we have shown that to be deleted. So within Anaconda, the focus area remains in these two areas.

I know there was some questions about why this area and not in between and that sort of thing. I think it's still kind of a mystery to us that certain areas popped up. One, you start with the premise you've got a lot of data and you let the computer do the work. It may give you some funny

sort of things. It's also dependent upon where the data is collected.

It's very possible in some of these areas, that if you get several data points, it may be biased because they're maybe from the boulevard and where there may have been some slag from street sweeping, they may actually bias those to be a little high.

It may be there's also actually something occurring there, maybe some drainage coming of the hillside or maybe that's just where some of the aerial emissions deposited. But at least the way we're showing this is these were the areas, based on our best techniques, that had the possibility of having soil that would exceed the 250 parts per million action level.

With that, the feasibility study that we conducted, we really wanted to accomplish several objectives. Let me back up one step here. As part of the evaluation process, I mentioned we looked at railroad beds within the community as well. Generally, what we saw as we sampled, we had samples all along the railroad tracks in this particular area.

Generally, we had values that range

from the hundreds all the way up to the 4,000 parts per million arsenic. And generally, the average for the railroad beds all through this area exceeded 1,000 parts per million, which in our estimation is fairly high and is also indicative that those railroad bed materials were probably constructed of tailings and slag, maybe ore concentrates and things like that over the operation of the Smelter.

So the railroad bed actually became an area of concern within the community. And actually of a lot of the things we see in the community, it actually has some of the highest values in the community that we see compared to the soils that we've sampled. So the entire railroad bed from east Anaconda yards to the west end of town is also an area of concern that we want to address under this proposed plan.

Primarily, those areas that are adjacent to residential areas or have potential to erode material in the residential areas, but we also wanted top address that whole railroad bed because of their elevations and because people worked there and materials have the potential to transport via the wind and other things to the rest of the community. So railroad beds are included as

part of this project.
    In other words, in the feasibility study, we had several objectives that we wanted to accomplish by the remedy that we chose. Essentially for soils that are in people's yards, we really want to prevent ingestion, inhalation, contact with any of those soil materials that exceed the action level that may increase somebody's risk. We wanted to do that for individual yards that exceeded the action level that's proposed here.
    And then the railroad beds, we wanted to prevent contact with the contaminated material and prevent surface runoff and wind erosion from the railroad beds. In doing that, we looked at four alternatives for the soils and three alternatives for the railroad beds. The four that we looked at for soils include no action, which we were required to do; institutional controls, which included an educational program, in-place treatment, which essentially was the mixing of those soils to reduce arsenic concentrations; and then the removal of those soils that exceed the action level.
    The railroad bed alternatives that we chose to look at were, again, no action, the capping of the railroad bed materials, and the total removal

of the railroad bed materials. All of these alternatives were evaluated against nine criteria that EPA is required to look at, things like protectiveness, does not meet the environmental regulations, long-term effectiveness, short-term impacts, cost effectiveness, community acceptance. I'm sure I'm leaving some out but at least that's kind of the gist. Then we compare them against each other.

Based on that evaluation, I guess tonight we're here to propose the ones that we think are the best of those four soil and three railroad bed alternatives. With that, I'll speak to those alternatives because I think that's what everybody wants to talk about. Is there any questions on some of that technical information? I probably spent more time than I should have on it. It still may be a little bit on the technical side.

(No response)

MR. COLEMAN: What we're proposing as the preferred alternative for soils is to clean up all current residential soils that exceed the 250 parts per million arsenic concentration using Alternative 4, which is the removal of those soils and then replacement with a vegetative or other

protective barrier. It could be gravel, pavement, some sort of parking lot, or whatever might be the land use that's there.

What we want to do to try to address, to find those areas of the 250, we're going to focus the cleanup in those focus areas that were shown on the map both regionally and within the community of Anaconda. What we would like to do within those areas is get access; sample, because like we said, just because you're in the focus area doesn't necessarily mean you would exceed 250, so we would like to sample your yard to find out if you actually do exceed 250; and then if so, take the necessary removal actions that we need to do.

We want to kind of prioritize our cleanup efforts at the site here. We want to address barren areas first or areas where children might be playing, especially if there's children] playing in barren areas. Those that pose the greatest concern to us have the greatest chance for exposure, so we'll try to address those areas first.

Then ultimately, we would try to address all soils that are greater than 250 even if they have a current lawn or healthy lawn there. The though with this is that if down the road that

something changes, we want to remove the yard, put a garden in, the lawn dies, then you have exposed soil. There is a potential for a future exposure there. Typical with most Superfund cleanups, we would try to address those soils as well, but because they would have a lawn on them now, they would be a lower priority and we would address those areas last.

In addressing an area that was greater than 250, we propose only addressing those areas that are greater than 250 and only those portions of a yard that might be greater than 250. We would have to come up with some sort of sampling strategy to look at yards. We're looking at the front yard backyard, side of the yard, but we would really only want to focus on those areas that are greater than 250.

We might have a yard area where actually somebody brought in clean sod in the back. Well, it doesn't make sense to dig that stuff up because you might have something more elevated in the front yard. So we really want to focus our cleanup efforts to those areas that might actually -- or that actually do exceed 250 parts per million. We would only clean up the depth of

soil that actually exceeds 250 parts per million. Based on some of the soil data that we've collected to date in the community, what we typically see is that the concentrated elevations are in the top couple inches of the soil profile. So if we went into the yard and the elevated concentration were in the top three, four, five, six inches, well, that's what we would propose removing and replacing that with clean soil to a maximum of 18 inches. We would not go beyond 18 inches. The belief there is that 19 inches is protective of most activities in a yard: Garden, digging, dogs, play areas, and that sort of thing. So we would cut it off at a maximum of 18 inches.

We would only do removal in those areas where we could really do removal. As a lot of you are aware, in the eastern part of Anaconda, there's a lot of small yards and a lot of intricate workings over there. Some of those areas may not lend themselves to removal. So in those cases, we would try to look at other mechanisms. We might look at some of the treatment or some sort of a capping or something else. Again, we would try to bring that below 250, but where removal is not feasible, we would not push for that.

Because we are initiating cleanup activities in the focus area, we still wanted to have a program that allowed other folks that were outside of that area to have their concerns addressed as well. So in the other areas that are outside of the focus area, where individuals might suspect there's contaminants in there, maybe they said, "Geez, I brought in material 20 years ago and I know I brought it and I think it was contaminated then and I think it's contaminated now," or if they live next to the railroad tracks and their block wasn't included but it looks like there's contaminants that have eroded into the yard, or where individuals may have been part of a previous sampling activity and have actual data that says I might be above 250, we would also want to try to get to those people as well.

In those instances, the residents would need to kind of initiate that activity. We're looking to the County to kind of -- we're going to give the County the opportunity to run a program of this type. To date they have indicated interest in doing that, very similar to what Butte-Silverbow is doing with the lead abatement program.

What we were kind of envisioning is

that we would have a program to hopefully address other people's concerns through the county in those areas. And we would kind of basically go through the same format, you know, samples. And if for whatever reasons it's above 250, we would want to address those areas as well.

Again, those areas we might do on a more limited basis and we would do in a more programmatic approach. And again, it may take -- we would have to prioritize those with the other work. But all of this work may take several years. Again, I would emphasize again that based on the actual risk data that we've collected, generally risks are fairly low and I guess EPA would believe that if we took several years to do this, we're not really putting anybody at undo risk.

The second component in dealing with soils is to deal with future development in the area. Currently, this is being dealt with under the county's development permit system. Basically through this, through our proposal, we would propose continuing using the Development Permit System to look at addressing future residential areas. We would continue to use to 250, which is already in the Development Permit System. In areas where the

Development Permit System excludes some of our focus area, we would ask the County to include those areas so that all the focus areas are within these overlay districts that use the Development Permit System.

And because we're doing removals within the community, our preference through the DPS would be to do removal, again, with the same conditions that where removals aren't appropriate, we would look at other measures to do that work or to reduce the concentrations below 250.

We're proposing under this proposal that the costs of operating the DPS to the county aren't a burden to the county or to the taxpayers; and also, if there's any cleanup work that falls onto an individual that is outside of typical development of a property, that those costs aren't necessarily passed on to the individual as well.

And the third component of what we're proposing is the educational component, to develop a community protective measures program, which disseminates information to residents about some of the people that we talked about tonight in terms of risk. I think a lot of this risk information fairly alleviates a lot of fears in the community and we would like to share that with individuals.

We also have recommendations that would further reduce people's risks, you know. There's a lot of things that people can do themselves to help their own living conditions, that sort of thing, in terms of watching where kids play, washing hands, and things like that this. So this community protective measures program pulls together a lot of information like that, gets it to everybody in the community, just to give them a better understanding about their environment here.

In addition, this program would also set up a database on a geographical information system, which is very similar to what you see here. It provides a county a means of tracking soil concentration throughout the community to be able to track when somebody's yard is cleaned up or when it's sampled and it's not a problem.

The value of this system is that when you go to sell your house or a lender wants to have some assurance that it's not contaminated, you know, we should be able to use the county database, you know, what about this property? We can say: Oh, yeah, it was sampled back in 19-whatever, and it was below, it's not a problem.

Again, we've been doing work here for

about ten years. What we would like to do is compile all that information, give it to the County so that as you go on, and us and ARCO leave, you're able to use that information as a benefit to yourselves. Under this project, we would try to develop that program a little bit better with the County.

Let's see, I'm going to jump to our proposal for the railroad beds. What we're proposing for the railroad beds is basically to construct an engineered cover over all exposed railroad beds within the community. In doing that, we would consider both existing and future land use.

If there is a railroad bed that's abandoned, not in use, or has the potential to be used for something else down the road, we would want to take that into account. We would want to consider how that railroad bed is constructed, the height and slope of the railroad bed. Throughout the community you have a variety of steep railroad slopes over the Goosetown area, and then as you get further west and through the center of town, that's basically pretty flat in there. In our design of any kind of capping of those railroad beds, we would consider all those aspects.

We also need to -- you know, we want to work with the railroad, work with the County and ARCO to try to come up with a plan that satisfies all the needs, and do something, I guess, that in the bottom line, just makes sense.

In addition to capping the railroad material, we want to in certain areas, especially where we have the steeper slopes, separate the toe of the slope from adjacent residential areas or adjacent alleyways or adjacent streets.

In some of the areas in the eastern part of town, the railroad beds go right into somebody's yard or right into the street. We want to be able to create a barrier there either through the use of a retaining wall, curbing, to essentially prevent any migration of these materials off of the railroad bed itself. We might have to look at some, in certain cases, look at drainage and other things like that.

As part of this remedy, we're trying to prevent access to the railroad beds. We're kind of doing that. We're preventing contact by putting a rock cap or a cap of some sort on those areas. But I think also we want to look at restricting access. There is a potential that in certain areas, if it

makes sense, some additional fencing of the railroad beds and things like that. Again, we would need to work with the community and with the railroad to determine where it makes sense to do that.

But again, we're trying to prevent kids from playing on the railroad beds. It seems like it's a fun place to ride your bike and jump and things like that. Probably if I was a kid, I would be there, too. So hopefully, the combination of these things would allow us to be more protective of the children in the area and to prevent those contaminants from recontaminating yards or getting into the yards and things like that.

In a nutshell -- and there's some diagrams and things in here that I didn't put up here that kind of show what I was talking about, and I can put those up and discuss those further if there's any questions.

But in a nutshell, that's what we're proposing here. We think that the remedies that we're proposing are a good balance of EPA's criteria. We think that they're protective. We think the 250 part per million action level is protective. In the soils, the soils proposal that we're doing, we think that by doing the actual

removal versus any of the other things, we think it's a much more proven and protective way to get at the source for the costs that we would be spending out there.

For the railroad beds, we think that in that instance, to try to remove the railroad beds could be a real disruptive activity, not only to the railroad itself but to residents that live nearby. We actually feel that the cap can provide equal protection for a lot more cost effectiveness and have fewer short-term impacts and actually be more readily implementable. We could get out there and do that right away.

If we start looking at trying to muck up the whole railroad grade in there, it would end up taking a lot longer and we would have to coordinate it with the operation of the railroad and et cetera.

I guess if I was going to have a sales pitch to this thing, the whole thing is really to try to bring closure to Superfund within the community structure and for individuals. I think a lot of the questions that we always get, people come into your community, they want to buy property, they want to buy a house, and they're saying, "What about

this? Here's my soil value," or "somebody sampled my house," and that sort of thing, we usually can't always answer their questions because we've not ever established the final action level or identified areas that might be a concern or that are, in our opinion, to be cleaned.

So we're hoping that through this project, that we're able to tell people that we don't think there's a problem; and where we do think there's a problem, here's a mechanism to try to rectify it. We're working with the County to try to keep track of all this.

We want to try to make this user-friendly for people. We want to work with individuals if we come into your yard area to work with you, to, you know, I guess be user-friendly. I guess there's always a possibility that we can get into certain yards and people say, "I just don't want you here. I like it just the way it is." And I think we would respect that.

Again, that information is tracked by the County and somebody might have to come in and do something later on. I guess I would say even to allow us to come in and do the sampling and stuff is a benefit to you. Because if we can come in there

and demonstrate that you're less than 250 parts per million, that's a value to your property. And if for whatever reason you wanted to sell it, whatever, you can tell people, "Hey, EPA said this is safe."

So I guess that's kind of what we're selling. We're selling to get ourselves out of here. We want to bring our efforts in the community to a closure and give you a mechanism or give the County a mechanism or program that allows you to deal with these areas and to have a program to deal with any concerns that people might have, whether it's right now or a couple years down the road. We can set up a program that somebody -- you know, a dog digs a hole and says, geez, you know, something don't look right there. Boom, call the County, take a sample. Do I have a problem?

The whole hope here is that we can make residents feel good about your community, that it is safe; and probably more important, keep the development aspect going that some of the other work has already done. You're doing a lot of good things here. Here's a mechanism to keep your property valuable and developable or sellable, or whatever you want to call it. That was my sales pitch, I guess.

Then the last thing I have here is: Where do we go over after this process? After the comment period of August 9, what we'll do is evaluate any comments that we might get either here tonight or in writing. We will go back and finalize our technical documents. We still have some work to do on those. We will develop what we call response summary, which is really a response to every individual comment. And there's always a possibility that your comments could change the remedy. So we're not saying hard and fast it's a done deal. We want to hear from you and there is always a possibility of making improvements to anything that we do.

We would like to then finalize this decision by the end of September in what we call a Record of Decision document. After that point, then, assuming hat we're on the same track here, we would start negotiations -- primarily first ARCO to kind of get the ball rolling; and then probably shortly thereafter, the county because they would likely be a key player is this; also, the railroad to start the design process. And with any luck, if we had the program and the designs in place, our preference would be to be back out here

next year doing any kind of physical type of work where it is ever necessary.

MR. COLEMAN: That is it. Question?

UNIDENTIFIED SPEAKER: Why is the EPA preventing ARCO from leasing out their land for pasture?

MR. COLEMAN: I don't think that we are. I mean if there is -- we try not to get involved with any private interactions between whether it's ARCO or individuals. If somebody wanted to sell property, lease property, do whatever, we have the same arrangements when people are doing any kind of work, whether they are laying down fiber optics or whatever. They come to us and say, "Can we do this?" Again, we tell them what's out here. A lot of those are arrangements between whoever to do that work.

UNIDENTIFIED SPEAKER: Then it's okay for the EPA to say ARCO can lease out their ground for pasture land?

MR. COLEMAN: That's ARCO's decision to make out, yeah. I mean we're not preventing anything like that.

UNIDENTIFIED SPEAKER : If they want to;

maybe they don't.
UNIDENTIFIED SPEAKER: We're talking about samples in the residential area in my yard. How many samples would you take and how large are the samples? You don't bring a backhoe in there or something.
MR. COLEMAN: No, no, and that's something I think we need to work out the details because typically, and it goes back to maybe how we look at risk, we're really looking at exposure to multiple, you know, to your whole yard. We don't necessarily want to go to one spot and say, "This is representative of your whole yard."
You kind of want to -- it's some likely we take some sort of composite - this is what we've done in the past - we'll take a composite. If your composite is greater than 250, then we would come back and we would analyze the individual pieces to see if there was a portion of a yard or maybe the whole yard is elevated. That would tell us how to maybe clean up your yard.
UNIDENTIFIED SPEAKER: How large a sample do you take?
MS. HILLERY: Just a little plug.
MS. STASH: It's about two inches.

UNIDENTIFIED SPEAKER: When you did this sampling before, did you take samples out of the alleys?
MR. COLEMAN: You know, I've had that question asked and I couldn't remember.
MS. STASH: We did.
MR. COLEMAN: Did we?
MS. STASH: Yes.
UNIDENTIFIED SPEAKER: So in this targeted area between Alder and Chestnut Street, would you be doing the alleys again there?
MR. COLEMAN: I think to make sure we've addressed these areas, in the focus areas, I think we would like to go back in those focus areas, anyway, and make sure that we've got a representative sample there. Now, if we go back and look at the data and it said, yeah, we already sampled that, we may not. But if we've not sampled your alley or that alley, I think we would take a sample there.
UNIDENTIFIED SPEAKER: Our house is right on the corner of the alley. There is a lot of traffic. I was wondering, would that --
UNIDENTIFIED SPEAKER: And it would wash out.

MR. COLEMAN: Right, and that's exactly the reason we would want to do that because if we're cleaning up yards, we wouldn't them to be recontaminated. Again, in that part of town where yards are small, a lot of time, that's where kids play and activities are. Any kind of those sort of areas that are alley or barren driveways, that sort of thing, those would be areas that we would come in and do a sampling. Now again, within a yard structure, again, we have to develop a sampling strategy to see how we -- you know, we probably want to do similar materials like yard materials in one sample and maybe a parking lot or something as an additional one. But those are things we will work out with ARCO and the County to figure out how we do that sampling strategy.

UNIDENTIFIED SPEAKER: The alleys are dirt, and when you drive down them, you stir up the dirt, if you don't sample them, hell, you might as well go home.

MR. COLEMAN: Again, in a lot of cases, gravel and other things might have brought in. It may be clean dirt, but we don't know that if we don't have samples.

UNIDENTIFIED SPEAKER: If you don't

have samples and find out, you might as well go home. That's the first thing you should sample.

MR. COLEMAN: Again, it falls into our prioritization of trying to deal with barriers first.

UNIDENTIFIED SPEAKER: What about at the eves of the house, the drain spouts?

MR. COLEMAN: What we did, when the University of Cincinnati did their sampling, they actually focused on drip lines. So a lot of the data points that we actually see in the community are from drip lines. Again, when we do a strategy for a yard, we'll take those things into consideration.

I don't know exactly, I mean if we go to it and say, okay, this yard, we're just going to do, boom, four composites, or whether we'll be selective and try to look for particular areas, we'll have to work all that out. But in the past, we have considered those things like drip lines, play areas, garden areas, and things like that. A lot of these areas, we already have that data and we will use that data to help us make decisions on how to sample and where to sample and that sort of thing.

UNIDENTIFIED SPEAKER: Well, as it rains, it washes right off. So rather the drip line or drain line, when it hits the ground, it's not going to move much.

MR. COLEMAN: One of the things we've done with the data that we did collect is actually do kind of a statistical analysis between play areas and drip lines and that sort of thing. We don't see statistically with the data we've collected a large difference. I mean generally, what you see at the drip line and in other areas is generally fairly similar. We do see a little bit higher at drip lines and that sort of thing, but statistically, not all that different. Again, we'll take all that into account.

UNIDENTIFIED SPEAKER: That would indicate it's not coming in from the air, then.

MR. COLEMAN: It's hard to tell.

UNIDENTIFIED SPEAKER: It's probably hauled in there.

MR. COLEMAN: Possibly. The Smelter has been closed since 1980. I think in 15 years, with the rain and stuff, you see more of a -- you're not seeing just such an effect from coming off of the roof line. If metals are there, they're there.

Statistically, we're not seeing a lot of differences between those and the rest of the yard for whatever reason.

UNIDENTIFIED SPEAKER: When you tested, you tested down at the east end of Anaconda. When you tested, did you consider AFFCO polluting down there? I lived in Anaconda for 30 years and every year AFFCO keeps getting worse and worse and worse. I mean I can get up in the morning and there is black silt on my car. I've never seen it -- this year, I mean it's bad.

MR. COLEMAN: I don't think the sampling necessarily distinguished between where the contamination came from. Maybe that's a possibility that some of that is contributed by that. I don't know if there's any real way to distinguish that or not. I think at this point from EPA's perspective, we would not try to do that. I guess ARCO's always available to try to sort out if there's other folks that are partly responsible as well.

Now, if it's more of a question if we go and clean up areas and they're going to be recontaminated, that's a real legitimate question I guess I don't have an answer for you. But that's something to consider. Typically, I guess they are

regulated by whatever the current environmental laws are for their industry. I'm not sure what they are. That might be the best we can do.

UNIDENTIFIED SPEAKER: Well down there, I mean like I say, I've lived there 30 years, same house, and it's gotten worse each year. We've never had a smell like that at the east end of Anaconda, not until they put the electric furnaces in four years ago - five years. And you can tell it keeps getting worse. My grass is totally yellow. I've tried everything. I swear it's from the pollution from AFFCO.

MR. COLEMAN: I don't know. And it might be -- Andy Young here is from the State. It might end up being more of an air quality concern for ongoing industries and maybe Andy can talk with you and pass that on to any of the appropriate people.

UNIDENTIFIED SPEAKER: That's what I was wondering. If you're going to clean it up --

MR. COLEMAN: It's hard to tell what may be coming out of there. We just don't have any information from them.

UNIDENTIFIED SPEAKER: If you're going to clean it up, I think the foundry should be

cleaned up, too. I think it should be included in the cleanup. Like I say, each year it keeps getting worse and worse and worse down there.

MR. COLEMAN: Good point.

UNIDENTIFIED SPEAKER: You're using Deer Lodge County's masterplan in your decision and allowing them some flexibility in addressing situations that are local; is that right?

MR. COLEMAN: I think what we would do under the current Development Permit System, there is a lot of flexibility built in down there. In some of this, like our preference for removal, we may want to tighten that up. But what we would envision is that every situation that you go out and you sample somewhere is always unique.

If you're out in a rural part of town, rural country especially, I mean a yard isn't necessarily a yard. And especially if you're over in Aspen Hills or Clear Creek, you might be on the side of a mountain. So I think we would work with the County to be educated to make those decisions that essentially give them the flexibility to do that, and work with not only the County with flexibility, but we also want to be able to, as we're dealing with individual landowners, to think

that they have say in what's happening as well.
        So I would say, yes, we would try to build in a lot of flexibility to what we're doing here.
        UNIDENTIFIED SPEAKER: You're using the masterplan.
        MR. COLEMAN: We would use the masterplan because it is the mechanism by which the County, through the county commissioners, can establish boundaries of overlay districts and basically require the Development Permit System to be required.
        So we are looking at that component of the masterplan and the Development Permit System to be in effect. It actually becomes an institutional control. We are relying on the County to do that. Now, within how they operate that, like I say, we give them some flexibility to do that work.
        UNIDENTIFIED SPEAKER: But it's not a completed masterplan yet.
        MR. COLEMAN: I'm not sure whether it is or not, but I think those components, at least the components today where the Development Permit system is being required are actually, I believe, in place. We would at least focus on those parts.

I don't think we have to have the entire masterplan, which really deals with the whole county, in place to do our work. But we do need to make sure that the County does have the pieces of the Development Permit System in place for this. We would work with them and with your county commissioners to try and do that.

UNIDENTIFIED SPEAKER: How would you review something like that if it's in the works right at this minute and yet you have a time constraint on public comment? So you're asking us basically to do a public comment and to trust the local government and you?

MR. COLEMAN: Yeah, I think we're proposing that to a certain degree. I guess if you want to comment and say, "Geez, I don't trust that," I think that's a valid, fair comment. I think we have utilized it in the past. I guess we believe that we can develop a program with the County to do that work.

It's not a guarantee and maybe the appropriate response would be if we can't do that, then we have to go back and kind of say, "That part failed. What do we need to do to compensate for that?" Typically when we do a remedy, we do

contingency remedies as well.
Any of these things that we propose could fail. If they fail, we have to go back to the drawing board. I mean that's the risk we take We're going to try to work this out through the County. If it don't work, we have to go back to the drawing board. We can do that, Superfund allows us to do that kind of thing.
UNIDENTIFIED SPEAKER: What's the advantage of the permits?
MR. COLEMAN: I guess the biggest advantage, well, for new construction starts, the way I understand the Development Permit System, if you don;t get a permit, you're not supposed to build. That's the biggest advantage to the permit system from the county's perspective.
But I think from our perspective, the advantage is that it allows you to know what is on your property and if any sort of action needs to be taking place. And it should make the property more valuable. I mean if you want to then see that property in the future, you say, "Hey, it's been tested or it's been cleaned up," you know. That's a marketable thing. Those are what I see as the two biggest benefits of having that done.

UNIDENTIFIED SPEAKER: If I wanted to build a building, I have to go up here and buy a $1,000 permit to build an $800 shed, it's ridiculous.

MR. COLEMAN: Well, as far as I understand, and again, the way this is supposed to be set up, is that there should not be or we would not expect a cost --

MS. STASH: It's a cost, zoning.

MR. COLEMAN: And there's other zoning things I guess we don't have control over. The Development Permit System for dealing with a residential home, again, it's set up so that -- right now it's set up, I think there's minimal cost because until this remedy is in place, a landowner does have some responsibility to pay for the sampling, which is minimal, and to do the construction in a certain way.

But again, we work with the County and the County then works with individuals to try to do that in a way that minimizes cost. Again, we would do the same thing, except I think we would actually propose that the cost of sampling and anything the County would do would be taken care of by the County and those costs be taken care of, and that any costs

that would be beyond typical construction, you know, could be something that we would also take care of.

I think in most cases, the practice that we've seen is that a lot of the cleanup that might be necessary with a new development can be taken care of as part of -- you know, you go out there and clear your -- level your land and that sort of thing. A lot of times, that takes care of the problem.

We would continue to encourage the County to work with individuals that way. We don't want the Development Permit system to become a real burden and slow down home starts and construction and make it impossible. Somebody says, "Geez, I've got rocks out here and I've got trees and I want the rocks and trees." Well, you should keep the rocks and trees. So we well work with the County to make this a workable program.

UNIDENTIFIED SPEAKER: What is your minimum cost?

MR. COLEMAN: On a sample?

UNIDENTIFIED SPEAKER: Yes, break it down.

MS. STASH: Nobody's being charged for the samples.

UNIDENTIFIED SPEAKER: I mean what's the actual cost?
MS. STASH: It's probably $25 - $100.
UNIDENTIFIED SPEAKER: Twenty-five dollars?
MS. STASH: The County's doing that right now under funding from this.
UNIDENTIFIED SPEAKER: That's what I wanted to know. If I wanted to have two or three samples taken, what's it actually costing somebody or me or something else?
The other question is: On your risk chart, 300 parts per million is 1 in 10,000, what is 250?
MR. COLEMAN: It comes out at about 8 times 10 -- so 8 in 10,000, 8 in 10,000 people. Let me explain. I guess excess cancer risk, a little bit, that's the additional, I guess, cancer burden a person might have in addition to what you already have, which is for most of us, pretty high already.
So we're talking about a normal cancer risk throughout the United States of 1 in 4 and this is an additional cancer risk of 8 in 10,000. It is a low risk but --
UNIDENTIFIED SPEAKER: It shouldn't be

that, should it? Because at 30, it's 1 in 100,000.
MR. COLEMAN: I think it actually comes out 8.4. We won't quibble over --
UNIDENTIFIED SPEAKER: 250, well, 250 parts per million would be the cleanup. That's what I was wondering what the risk was for that figure. That's the figure you're using for cleaning it up.
MR. COLEMAN: Two fifty.
UNIDENTIFIED SPEAKER: If it's above 250, you take it up. If it's below 250, you leave it alone. What's the risk at 250?
MR. COLEMAN: I guess I did misspeak because it's 8 in 100,000 is what it is.
UNIDENTIFIED SPEAKER: So it's about 1 in 12,500. Why don't you make this comparison thing and have that on it since the figure of 250 is what you're using.
MR. COLEMAN: Okay, there you go, 1 in 12,500. Get it right, get it right. I'm an engineer. I work backwards. I apologize for anything that's technically not coming across.
UNIDENTIFIED SPEAKER: In a targeted area, would the people be notified and asked to volunteer or will it be door to door, a person coming door to door to take the sample?

MR. COLEMAN: We have to figure that detail out, set up something with the County, sessions between the County and ARCO. You could do it in a survey or mailing or door to door. I'm not sure exactly how we might do that yet.

UNIDENTIFIED SPEAKER: Who takes the actual sample?

MR. COLEMAN: Again, we need to determine that. I think we're proposing or at least we would like to offer the opportunity to the County to do that. We would offer to the County to do as much of the program as they would like to take on and kind of coordinate that with ARCO. They may not want to do the construction work, or there's a mutual consulting firm or contract firm that does that, but in terms of kind of running the program and getting the information and working with individuals and sampling, we would look to the County to do that.

The County has expressed an interest in doing that. So that's kind of the avenue we're kind of looking at right now.

UNIDENTIFIED SPEAKER: What's your check and balance?

MR. COLEMAN: It's kind of a unique

check and balance because to get to that arrangement, ARCO and the County would have some agreement in terms of responsibility. Our check is to ARCO, to make sure that they ensure that the work is getting done. Typically, the County would want from us some protection in doing the work.

We end up with this triangle where basically us and the County have an agreement, we and ARCO have an agreement, and ARCO and the County will probably have some agreement. And we all kind of check and balance each other.

I guess EPA has -- I would say we have the biggest hammer. If the work doesn't get done for whatever reason, we can come back and first look to ARCO and say, "We need to get this work done." And probably if there's an agreement between us and the County for them to get some protection, we can look at them as well.

It's kind of the similar arrangement we have right now with the Old Works area and the golf course. I think it's going to work very well. I think there's enough checks and balances that we can keep everybody honest, I think.

UNIDENTIFIED SPEAKER: How do we keep everybody honest?

MR. COLEMAN: Again, I think it's through that same check-and-balance process. I think this particular project may -- I mean we have to be careful. One of the things we want to do with this project is make it a fair project, we want to make it fair to the individuals. We're not going to force anything down anybody's throats that don't want it. We want to work with individuals. But at the same time, we've got to be fair to ARCO.

It's not intended for some developer to come in, buy up a bunch of property real cheap and say, "Okay, ARCO, clean it up for me," and turn around and sell it to somebody else. That isn't going to work, either. All those things that can lend themselves to fraud or whatever, I think we'll address them in one manner or the other. Again, we want to make this fair for everybody.

UNIDENTIFIED SPEAKER: On that map, you have a gray-shaded area in the south of Anaconda. I don't see very much of the county's land affected. Don't you think that's rather odd?

MR. COLEMAN: Well, there are areas like Smelter Hill and some of the new property that the County has acquired. That's primarily because in their acquiring of that property from ARCO, the

deed restriction says there's no residential development. So we're only looking at areas that are potentially developable. I guess it was our estimation that people will not be developing on Smelter Hill because ARCO owns the property and they are not going to allow it.

Any transfers to the County have kind of been the same way. That's the reason that those are left out. I guess we could have said -- we could have had a big black thing and it still would be the same thing. Nobody's going to live in these particular areas, at least to our best assumption.

Again, when we develop this through the Development Permit System, that sort of thing, we may just -- the Development Permit System is kind of an inclusive area so it may include those areas, anyway. But it's our estimation that people would not live there.

UNIDENTIFIED SPEAKER: Well, basically, they could, Anaconda would be responsible for taking the sample?

MR. COLEMAN: If they are in an area that people can live in and it's within our zone. Again, we would make adjustments. If we missed an area that needed to be included, we can add those

in. Yeah, the County would, under the Development Permit System or under this new program, we would sample these areas that were within the shaded zone to determine whether they are above 250 or not.

UNIDENTIFIED SPEAKER: If they are not in the shaded zone?

MR. COLEMAN: If they are not in the shaded zone and they're in -- like a big part of this south here, I mean we're actually, our estimates show it should not exceed 250. So we're saying it's clean. We think it's clean. It may also be excluded because there's a lot of areas out here that we just don't believe would actually exceed 250. So we would actually be coming to people and saying, "We're giving a clean bill of health. We think this area is okay."

I guess in those particular areas, again, if there's a reason for thinking that there might be some contamination there because of imported fill or there's a railroad or something like that, we can still sample those areas. That's the difference between the shaded areas and not is that we would focus on the shaded areas. The other areas, we think they're clean, but there's still a mechanism to be able to sample those through the

County.
UNIDENTIFIED SPEAKER: By looking at those maps, the emissions came from the Smelter, they jumped over the "C" Hill and crashed onto "A" Hill.
MR. COLEMAN: Maybe I'm looking at -- this area over here?
UNIDENTIFIED SPEAKER: It's the one behind your butt on the other map.
MR. COLEMAN: This area in here?
UNIDENTIFIED SPEAKER: That's the one.
MR. COLEMAN: Maybe I think -- well, I guess that was our assumption that is not anticipated for residential development. If I'm wrong, I would like to know that. I guess that was my assumption, nobody lives up there or would live up there; that it was, I'm not sure, I don't think it's public ground, maybe some of it is County's property and whatever, but that was the reason for that. I was confused on which area you were describing there.
UNIDENTIFIED SPEAKER: If it was county property and was in that area, it would -
MR. COLEMAN: It would probably be a shaded area and would fall in the same category that

we could go out and sample that, and if it was above 250, clean it up.

MS. DALSOGLIO: Let me reassure you that area is not being written off by this action, but the whole Smelter complex area, the final decision on the remediation up there is still to be made in the next year.

So what Charlie's trying to show here on this map are the areas where we, to the best of our understanding, are predicting where people currently live or will live in the future, and then where we would apply this remedy. The remedy for Smelter Hill, that green blob in the middle of the shaded area there, is part of the other project that Charlie mentioned earlier, Regional Water, Wastes and Soils, and that remedy will be selected next year. So we'll be coming back to talk about what the final remedial action on Smelter Hill will be.

UNIDENTIFIED SPEAKER: Smelter Hill is only part of that. That's the front of "C" Hill there, John, you're talking about. What about the front of "C" Hill?

MS. DALSOGLIO: That's also part of this project next year. Everything that you see colored on those maps outside of what he has shaded

in that he's predicting where people live are being addressed in this other program.

UNIDENTIFIED SPEAKER: That's all county property, the front of "C" Hill, that's all county property. They planted trees up there. You can go up and look at them trees. Out of, I'd say, 100 percent of them trees that they planted, maybe 10 percent grew and that's it.

MS. DALSOGLIO: We've actually gone up there and surveyed those areas. Again, we're looking at whether or not we should go back in there and do additional reclamation work in this decision that's coming up next year. I want to assure you it's not being ignored.

MR. COLEMAN: We're not saying it's not elevated metals. I mean if you look at this map, we're estimating elevated metals there. Basically, we just don't believe that there's residence up there. And if there is residences --

UNIDENTIFIED SPEAKER: No, there's never going to be residences that out there.

MR. COLEMAN: That's why it's not included.

UNIDENTIFIED SPEAKER: The only resident in that area is Nazer.

MR. COLEMAN: That's why that's not included. But Julie's correct. We will look at it.

UNIDENTIFIED SPEAKER: If you look behind Nazer's in that gulch, when they tore down the beryllium plant, that's where they dumped the garbage was in that gulch there. That's where all the old bricks and beryllium from the beryllium plant is buried in that gulch.

MS. DALSOGLIO: We've identified that, we know that material was there. We've identified it. We're looking at whether or not we should go in and remove that material or just leave it alone or whatever. Those kinds of decisions, again, are being addressed under this other project.

UNIDENTIFIED SPEAKER: What about Nazeer's? Is there any cleanup for around Nazer's? I would like to know what they are going to do with the foundry and stuff. Are you guys going to clean up around the foundry? That's another area. The foundry has been there a hundred years. You look behind the foundry, there's a dump, waste dump behind there where they dumped everything, I mean everything in there.

UNIDENTIFIED SPEAKER: That's not on there because it was at one time county property

that they sold, and all the county properties that they sold happen not to be on there.

MR. COLEMAN: That's not the reason they are not on there.

UNIDENTIFIED SPEAKER: That's a little bit strange to me. I can tell from the get-go who has some influence.

MR. COLEMAN: This project is really dealing with where we think residents would be. Julie's correct. I mean all these other things you're talking about are still being evaluated.

I'm glad you bring up some of those issues because I think that's important information for Julie to look at because that last project that Julie's working on needs to address anything else that we haven't addressed to date. But, you know, this project only deals with residential yards and where people are actually living. That's just the way we broke it out.

UNIDENTIFIED SPEAKER: Yeah, but the wind. You don't live at the east end of Anaconda. The wind blows down there. That's the hardest place. The wind blows off of "C" Hill. I mean the dust is kicked up clean down to Benny Goodman Park.

If you're going to clean up the

residential areas, you've got to clean up the front of "C" Hill, AFFCO, foundry, and Nazer's. You've got to do all that. Why clean up the yards when you're going to leave that? That's one of the biggest -- that pollution, I'd say, did not come from the Smelter. It came from up there on "C" Hill and from the foundry.

MR. COLEMAN: We're not saying we're not going to address these areas; just not under this particular project. As Julie was saying, those areas will be evaluated and we will look at just the thing you're talking about. Do they present a risk to the community? Is there a pathway for dust and surface runoff and all those things? Those things, that's exactly what Julie's working on.

MS. DALSOGLIO: We agree. EPA has the same concerns that if we clean up an area or apply a remedy, we don't want something uphill to recontaminate something that we've already cleaned up below. That makes absolutely no sense. So we agree with that statement. That's part of what we want to make sure that we wrap up in this last decision.

UNIDENTIFIED SPEAKER: Like John says, why isn't the front of "C" Hill being considered?

Why has it been passed over?
MR. COLEMAN: It hasn't been. That's what I'm trying to say. It has not been passed over. It's part of the ongoing project.
UNIDENTIFIED SPEAKER: The County owns it.
MR. COLEMAN: That doesn't matter. I mean ARCO's property, the County's property, whatever, those properties that are still out there that have contamination, we're still evaluating. We're not done here. This isn't the end of the project area. We're just dealing with a portion of it.
UNIDENTIFIED SPEAKER: Will you send out the county to test their own land?
MR. COLEMAN: Sure.
MS. DALSOGLIO: Actually, we've collected soil samples from those areas. They have been collected by efforts that ARCO has done of the site, they've been collected for the US Department of Justice in another program, there's also been soil samples collected in that area for the State's Natural Resource Damage Assessment Program. We have looked at all of that data. That's what created the map on your far left side that shows the elevated

concentrations of arsenic and that's why you see the broader areas that we investigated. So, no, the County has not gone out and sampled their own property. That area has been sampled by three independent sources.

MR. COLEMAN: We can continue this discussion. I guess in the essence of time and wanting to give people an opportunity to get on the record for the public comment, I would like to try to switch into that gear. And you guys have an opportunity to come in and comment on that. I would be happy to come back and discuss this. I don't want to lose everybody here before they've had a chance to formally do that.

I guess I'll be available after this next portion, which is anybody that wants to come up and formally say anything, you're for it, against it, whatever, here's your opportunity to do that. Then if anybody has an additional questions, Julie and I and Andy or anybody else are willing to stay afterwards and discuss any of these with any of you.

Maybe the best way to do that is have folks that are interested in making public comments, probably a good, clear way, if you wanted to come right up here, state your name and if you have a

comment. I really can't respond to a question during this period. It's really your opportunity to say: I support the remedy; I don't like the remedy; you should do this, or whatever. You can be as brief as you want.

I think there's a small enough crowd, I won't limit anybody on time. We can just proceed that way. If there is no interest and people would rather write, that's fine, too. You don't have to come up. But here's your opportunity to do so.

I guess we'll let Sandy start it off here.

MS. STASH: Maybe I can answer questions and make a comment at the same time.

For the record, my name is Sandy Stash. I'm the Senior Manager for ARCO, and hopefully actually answer some of the questions folks had.

We have given some thought to how this whole thing can be implemented. I guess before I start there, an important thing, and I think Charlie said it and if I can restate it, I know for a long time in this community it was a real concern that the community was at risk. I think anybody who has been here for along time probably remembers times in school where various times they came through and

sampled kids for arsenic and everything else. I think the real good news out of this whole thing is that this community is not at risk. And I think that's a very clear statement in some of the things that Charlie said.

I think additionally, since this work has limited this down to basically about a 14-block area, that as near as I can tell, about four to six of them were the park or non-residential, that we've really got a very small focused area that we need to be concerned about. That's important for anyone who ever has tried to sell a house here because that means there's 95 percent of the community that basically does not need to worry about this issue in that regard.

Charlie said something else, too, that I guess I wanted to reclarify because we are the ones that actually did the sampling. With the exception of Teresa Ann Terrace, which had some old deposits from the Old Works that came from the smelters in the form of tailings, we did not see any elevated level of arsenic below the two-inch level. So if you live in an are that is in that focus area subject to sampling, I would be extremely surprised in out of just thousands and thousands of samples

that were taken, that you would see anything below the two-inch level.

That differs a lot from Butte because in Butte, because everything was built on mining waste, you see elevated levels at deeper depths. Here because it was from the stack, it's very, very shallow. So I think that's something that people need to take note of.

Finally, Charlie did the best job I've heard in a long time explaining kriging, but what people need to realize, if you live in that area, it doesn't mean you have high soil levels, it means you have a chance of having high soil levels. That's why some of the sampling is as important as it is. If our experience in Butte proves true - and when I say "our", actually the city of Butte, community of Butte - when they went back after the initial sampling and looked, I believe they expected about 100 yards that might have elevated lead. And indeed, what they found so far I think is 5. They are not done yet. But you need to understand a little bit the nature of statistics.

Charlie used the word "we" a lot. I guess if I could just briefly outline how we see this cleanup remedy getting done, we do, despite the

comments from the back, see this as the very best way to do this as a county-driven program.

We're into the Butte program about two years now and I guarantee you a local government does a lot better job with programs, community protection programs and whatever, than a large oil company can do or the Federal Government can do. In that regard, we've had some initial discussions with the county and expect that how this would be structured is that it would be county driven and directed. As the Local Health Department, the local agency, they are in the very best position to do, I believe, all of the work associated with this remedy. That's indeed what's been done in Butte and it's very effective.

Secondly, the reason that the Butte Lead Program has been successful is it's landowner directed. It isn't something that somebody from the outside, a federal agency or company or whatever, is directing the landowner. We would view this as something that the landowner very much would have the prerogative to have a place in the county they could call if they have a question and feel that they may have a concern about a bald spot in their area, should they live in the focus area in town or

whatever.

And the key elements and the elements that we would be willing to fund with the County are basically education, the sampling. And that gets to your question about how much do samples cost. We would expect to provide money to the County such that they can go out and take some samples and then get back to you without us ever being involved. Again, we feel they're in a much better position to do that. Clearly, we will give them the resources to do that and finally give them the resources for any sodding or anything that would need to be done in bare areas that might have elevated levels in those focus areas.

They have a very effective program in place. I guess despite your concern about permits, the development permit part actually doesn't cost anything. I think you do pay for building permits here, but the thought is that if you live in the focus area east of town, you've got a bald spot, you've got a question, you have a place to call. You don't have to pay to call that place and somebody there in the planning or health department in county government, they would come out, they'd take the sample, they'd get back to you. If it

looks like an issue, they could provide you with sod and technical advice or whatever that needs to be done, if there's dirt work. So that's basically how we see the thing being structured.

I guess the reason I feel so strongly about it - and encourage anybody that has questions to talk to a guy named John Mike Downey in Butte who runs the Lead Prevention Program over there. I know that it's been noted as a real national model. In fact, Cameron Buhl who was here and may have left --

MR. BUHL: I'm still here.

MS. STASH: -is somebody who could also, I think give some description of that.

How we would see this happening, we've made some progress towards this already, is we will provide funding to the County for at least two additional positions, one being an individual to run this program. That would be both the permit program as well as this education outreach.

Secondly, a person that would run rather sophisticated piece of equipment, it's mapping equipment, geographic information system, why that's important, something Charlie said, which is it's a way to track so that when you go to sell your home, there is some kind of concern, there's a

tracking that your property has been checked or that your property isn't in an area of concern.

Right now there's a little bit of a black cloud over a good part of the town because of the concern over Superfund. So I think we feel that the mapping system is a way to help with that to a great degree.

Those two positions as well as some additional funding for sampling comes to the tune of about an additional 150,00 a year, in addition to the 100,000 that we're already providing. If you notice in the proposed plan, most of the cost associated with the remedy that EPA has proposed is for this program. Again, we have a choice. we can try to do it under EPA order or we can accept the EPA order and then empower the local community to do that.

Again, despite those earlier comments on fraud and everything, I think most of the people would feel that the local government is the very best place to put that kind of program.

On the railroad beds - I see Bill McCarthy here - we actually haven't had a chance to visit about this, but how we would envision that being done, because that is an active railroad that

Bill McCarthy and his company make their living off of, is that would be something very much that we would look to work with the railroad on. It's a business associated with re-ballasting certain parts of the railroad bed and you're probably in the best position do that. We would envision some sort of a discussion settlement with the railroad on just how that would be done.

Anyway, in our estimation, this is probably about a two- to three-year program that would need to be funded, perhaps with a couple years after that to make sure that people continue to get information. It would be integrated into the existing Development Permit System. Again, that is allowing for some of the development that you're seeing happening at Teresa Ann Terrace right now around the golf course.

I think if structured this way, it's a very workable remedy. I think it can stand to be kind of a national model, very much like the lead program in Butte as far as ways to deal with these issues.

And I'm like Charlie, I'll be happy to answer questions after the meeting if anybody has any. Thanks.

MR. COLEMAN: Thank you. Next? Don't be shy.
MR. McCARTHY: Can I make an informal comment, Charlie, and a written -
MR. COLEMAN: you can do it verbally and still do writing, that's not a problem. You get more chances than one.
MR. McCARTHY: I'm Bill McCarthy. I'm with the railroad in town. I think our initial view on the proposed alternative for the railroad beds is basically acceptable. We reserve the right to comment and maybe suggest some ideas and bring up some concerns that may not be readily noticeable, but I think it's headed in the right direction. We would like to be part of the work plan and get, you know, tell our ideas on how to maybe improve the remedy. But basically, I think it's headed in the right direction. Like I say, I will probably make a more formal comment in writing just to go on the record formally.
MR. COLEMAN: Thanks, Bill.
ELLEN TOCHER: I'm Ellen Tocher and I live in the focused area right probably in the middle of it. When I got the proposed plan and seen that we were right in the middle of this focus, I

kind of thought, Oh, my God. But you relieved my fears tonight to know that we might not have this arsenic in our yard or that we were just picked out of the whole city.

MR. COLEMAN: Thank you for your comment. Anybody else?

MR. SEVORES: Can I do it from here -

MR. COLEMAN: It works better if you could at least speak loud enough so Candi can get you on the record. That's the main thing. It helps her to see you speak.

MR. SEVORES: My name is John Sevores. I'm a resident of Deer Lodge County and I would like to make a request of Sandy Stash and Atlantic Richfield. And that is that in the Copper Village Art Museum, they have a copy of the Bliss case which involves The Anaconda Company, Standard Oil. It's 15 volumes. It's a referenced that tells the whole history of this valley, about what happened when the industrialists beat the farmers to death.

However, it would take me years to go down and read it, half-an-hour - 45 minutes a day. Is there any way possible that Atlantic Richfield could provide a reading copy at the Hearst free library of the Bliss case so that people that wonder

what is happening with this valley, what is the history of this valley, and why it is the way it is could have a reading copy to research the early 1990s when the same thing happened before. And that was basically The Anaconda Company bought this valley.

MS. STASH: You're asking me now about something that happened in 1910?

MR. SEVORES: No, I'm talking about the Bliss case which is an important document in Anaconda's history.

MS. STASH: I'd be happy to talk to you after the meeting.

MR. SEVORES: But it would be nice for research if you could actually read a copy of the case rather than it being locked up at someplace where it really isn't accessible to the amount of time that it would take to research. That's all.

MR. COLEMAN: Okay. we had a request there.

Any other comments? Is there anything you want to share? Going once, going twice, okay. Like I said, it doesn't prevent anybody from still and we would strongly encourage any written comments on the proposed plan.

There is an address, I think, in the hand-out package on the last sheet, there is an address to send the comments to myself and all comments will be responded to one way or another

Again, on behalf of the EPA, we would like to tank you folks for taking time out of your summer evening to come and listen to our spiel. We hoped we are headed in the right direction with this community and I guess we look forward to the next step of this process to actually implement these programs so that it starts to work for you. Thanks again for coming.

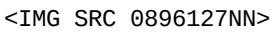
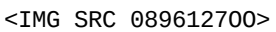
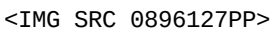
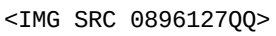
* * * * *

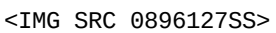
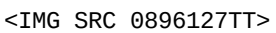
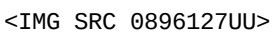
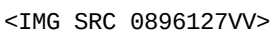
CERTIFICATE

STATE OF MONTANA)
:SS.
County of Silver Bow)

I, Candi Nordhagen, Registered Professional Reporter and Notary Public in and for the County of Silver Bow, State of Montana, do hereby certify:

That the public hearing was taken before me at the time and place herein named; that the hearing was reported by me in machine shorthand and later transcribed by computer, and that the foregoing seventy-eight (78) pages contain a true record of the proceedings, all done to the best of my skill and ability.

Attachment B

Written Comments Received During Public Comment Period

<IMG SRC 0896127WW>
<IMG SRC 0896127XX>
<IMG SRC 0896127YY>

July 23, 1996

United States Of America
EPA Office, Montana
ATTENTION: Charles Coleman
301 South Park, Drawer 10096
Helena, Montana 59626

Dear Mr. Coleman:

As promised, enclosed you will find my thoughts on the Anaconda Super Fund Proposal specifically involving the Aspen Hills Clear Creek area. Realizing an almost life long dream, approximately one year ago, I bought a 40 acre lot in the upper Clear Creek area. Prior to buying the Clear Creek lot, I diligently attempted to get clarification on various concerns of mine including what were the surrounding communities like, whether these communities harbor violent right wing paramilitary groups, as well as environmental risk of the surrounding country side. I discussed the latter issue with you on several occasions and in addition to reading about arsenic exposure and questioning other state agencies (e.g., the last State agency I talked to for instance had the responsibility of monitoring the quality of ground water and they had no evidence of arsenic or any metal levels in ground water in the Aspen Hills Clear Creek area). I felt very comfortable and at peace with the decision to buy the Clear Creek lot and I made two trips to the Anaconda area last year. These trips only reinforced my belief that I was indeed blessed at the opportunity to buy a beautiful 40 acre mountain lot near a beautiful old historic town with a 200,000 plus wilderness to the west and a 50,000 acre wild State Wildlife management area to the east which would hopefully quench my thirst for hunting, fishing and other outdoor activities (I was and still am so much in love with my mountain lot that three months ago I actually bought a second adjacent 40 acre mountain lot). Approximately one week ago I received my title insurance to the second Clear Creek lot and although receiving it was a mere formality to me, I was nonetheless excited to receive it until I saw the sentence stating that my property was in a Superfund site. This factor has been known to me for approximately one year but actually seeing it in writing gave me a bad, uncomfortable, almost nauseating feeling, a feeling of having done something I should not have done. This however is not my true logical deep feeling for my land and the surrounding area for which I have come to really appreciate and love.

<IMG SRC 0896127ZZ>

If possible I would like to respectfully ask you why can we not at least name the Aspen Hill Creek area simply Aspen Hill Clear Creek District instead of Super Fund site with all the accompanying negative connotation that goes with that name? I would respectfully suggest that the same building permit process or whatever final building permit protocol that is finally decided would still be in place not compromising on the health of the residents or the environment, while at the same time removing the stigma associated

with the designation Super Fund site. This would seem to me beneficial in the short and long run for the county, and again most importantly not compromise on the goal of decreasing environmental risk. Is there a good reason why we shouldn't change the name to something else if we don't compromise on the health of the environment or its residents in the process of making that name change? I have no strong feelings regarding various proposals for making the arsenic levels in desired less than 250 parts per million range. I only hope that the final plan would be based on science as well as maybe flexibility that would take into account on how one plans to use his own property. Based on arsenic levels that were shared with me recently, my area of Clear Creek actually has levels less than the 250 parts per million range.

These issues are obviously of great importance to me. I hope to some day complete my dream by building a cabin on my lot and spending at least summers in Clear Creek contributing in a positive fashion to Anaconda Aspen Hills Clear Creek community. I hope that you and county officials give serious consideration to changing the name of the Super Fund site in the Aspen Hills - Clear Creek District to anything else other than Super Fund site. It may be, just may be, by the time I visit Montana in September I won't be tempted to grimace the next time I look at my title insurance document. I really look forward to hearing from you and county officials soon concerning this matter.

Thank you very much.

Sincerely,

<IMG SRC 0896127AB>
<IMG SRC 0896127AC>
<IMG SRC 0896127AD>
<IMG SRC 0896127AE>
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COMMENT SHEET

Please write any comments that you may have concerning the preferred alternative on this sheet.

The Anaconda Environmental Education Institute (AEEI) is in support of the Community Soils Operable Unit Proposed Plan. This plan is in the best interest of Anaconda-Deer Lodge County with respect to human health and the environment. Furthermore, we commend the EPA and ARCO on their efforts and cooperation with each other to devise a remedy that is not only cost-effective but beneficial to the quality of life in Anaconda-Deer Lodge County.

Name: Anaconda Environmental Education Institute (AEEI) (Todd Emslander, Meg Hickey and Don Pawluk).
Address: 118 East Seventh Street Anaconda, MT 59711
Phone: (406) 563-5538

BROWNING, KALECZYK, BERRY & HOVEN, P.C.

ATTORNEYS AT LAW

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OLIVER H. GOE
STANLEY T. KALECZYK
CATHERINE A. LAUGHNER
JOHN H. MAYNARD
SHARON A. O'LEARY
LEO S. WARD

August 9, 1996

Mr. Charles Coleman
Ms. Pam Hillery
U.S. EPA, Montana Office
301 South Park, Drawer 10096
Helena, MT 59626

VIA FAX

RE: Anaconda Community Soils

Dear Mr. Coleman and Ms. Hillery:

On behalf of our client, RARUS Railway Company, we are submitting the following comments on the Preferred Alternative for Railroad Beds at Anaconda Community Soils.

While the preferred alternative is generally acceptable to RARUS, we would recommend certain modifications. The use of large rock for capping areas within the shoulders of the railbeds, around switch stands, and at locations where utility easements exist under trackage or where signal wire is buried is problematic for maintenance and repairs. The large rock is very difficult to dig up, and can cause maintenance problems with ties and trackage. Therefore, we would suggest the use of clean ballast from shoulder to shoulder of the railbed and in other areas mentioned above.

Other lines, properties, or portions of lines may be suitable for remediation at this or some future time. In addition, there are properties adjacent to the railbed which may be suitable for non-railroad activities, such as commercial or residential development. Those areas may also need to be remediated. RARUS would be happy to discuss those potential areas with EPA at a future date.

Thank you for the opportunity to comment on this preferred alternative for Community Soils. Should you have any questions or concerns with regard to these comments, please do not hesitate to contact William McCarthy or Leo Berry.

Sincerely,

BROWNING, KALECZYC, BERRY, & HOVEN, P.C.

<IMG SRC 0896127AK>

cc: Bill McCarthy

AUG-16-93 FRI 2:26 GOLDEN COLORADO USA
<IMG SRC 0896127AL>

August 16, 1996
Mr. Henry Elsen
USEPA Region VIII Montana Office
Federal Building
301 S. Park, Drawer 10096
Helena, Montana 59626-0096
Fax (401)441-1125

Re: Review of Final Draft--Community Soils Operable Unit Remedial Investigation/Feasibility Study Report

Dear Henry

I have reviewed the statistical and geostatistical portions of the Community Soils RI/FS and have these comments:

! The text and the plots discuss the impact of soil contamination with arsenic a risk-based screening level of 1x10-4 RME risk. According to Table 2-10 Volume I, this gives an RME for arsenic of 297.0 mg/kg for the Residential Scenario and 1003 mg/kg for the Agricultural Scenario. However, at a risk level of 1x10-5 more commonly required by EPA, the RME becomes 29.7 mg/kg As and 100.3 mg/kg As for the Residential and Agricultural Scenarios. At these lower concentration level, most of the Anaconda Community Soils and the Regional Soils would be condemned as too contaminated. The report does not clearly explain why the more risk tolerant level has been selected for discussion.

! Volume II is mislabeled as Appendix A. Volume III has Appendix A-g

! The Text in Volume I, Page 1-9 refers to "thousands of data points" used in the analysis. The number of As samples used in this study for histograms of surface statistics is significantly less than "thousands":

Study Area	Before Cutting "Outliers"	After Cutting "Outliers"
Anaconda Community:	453	381
Opportunity :	87	83
Regional :	792	791
Total :	1332	1255

! Even before "outliers" were removed, the text discusses other data points removed from the study as nonrepresentative in a non-informative manner. For example on page 2-10, Volume II, the text reads:

"Sample results from 10 regional targeted stations (21 total surficial samples) located along the berm of the Yellow Ditch...were excluded from the regional soil data base because of analytical results from these samples were not considered representative of metal levels in native soils at the site. Furthermore, analytical results from soil samples collected....from 30 community soil stations and 24 community targeted stations located in Anaconda were also excluded from the regional surface soil data base"

No mapping of these affected samples was done in the report. Nor was preliminary statistics done before these "nonrepresentative samples were removed from consideration.

! Of concern is the potentially inappropriate removal of the higher values of arsenic from the data base before the geostatistical mapping of arsenic contamination. For example on page 2-14, Volume II:

Using Table 3-2, the other samples which were removed as non-representative, with no detailed explanation were:

Data Set	Sample ID	Conc. (mg/kg)	Justification

Anaconda	AN007	13320	Related to OW/EADA OU
Opportunity	NC018	740	Related to tailings pond
Opportunity	NC019	780	Related to tailings pond
Opportunity	NC020	1000	Related to tailings pond
Opportunity	NC023	986	Related to tailings pond
Regional	M-6	27,200	Related to Smelter Hill

In each case these removed values are higher than the highest arsenic reported in Appendix C-Descriptive statistics. i.e

Anaconda Community -- 793 mg/kg
Opportunity Soils -- 488 mg/kg
Regional 3960 mg/kg

In all cases a more rigorous statistical treatment of these data points should be done before they are removed.

! Review of the many of the histograms in Appendix C, Volume III, shows that this cutting of the higher concentrations unnaturally truncate the lognormal distributions expected for metal contaminants. This is most noticeable for the Opportunity Soils area, where the loss of the highest four values impacts the lognormal curve for arsenic, cadmium and lead by cutting off of the bell shaped curve on the right side.

! Table 2-7, Volume I indicates the Regional Surface Soil Samples were composed of samples which have composite lengths in excess of 0 to 2 inches. In particular, there are samples with 0"-3", 0"-6, 0"-12", 0"-18, 0"-36", and 0"-48" included in this surface data set. This report has observed that concentrations of arsenic diminish rapidly at depth. The inclusion of this lower material in an average concentration of a sample will bias its value to the low side

! The kriging of the various contaminants in the Anaconda Community (p.3-5, Volume II) discusses the kriging block size as one set to match the size of the city blocks in the central and eastern parts of town. The text then fails to mention what size that is. It would have also been appropriate to discuss the rotation of the kriging grid to match the city blocks.

! Page 3-6 and 3-7, Volume II. The choice of the block size for the Regional (70 acres) and Opportunity (3 acres) should be discussed.

! The isotropic variograms of arsenic and the other metals proposed by this study is surprising. Greater ranges for the variogram should be expected in the directions of predominate wind, while lesser ranges in directions where the wind does not predominate. Page 1-2, Volume I discusses that the general surface soil contamination was likely contributed by smelting activities at the Old Works and Washoe Works smelters between 1884 and 1980. It states that the prevailing wind directions for the Mill Creek and Warm Springs Creek Valleys are primarily up valley/down valley diurnal flows. For Mill Creek this would mean winds generally from the south and north. For Warm Springs Creek Valley, this would mean winds generally from the west and east.

However, the text is in error in its assertion that the annual wind pattern for Deer Lodge Valley has a north and northwest component. It in fact has winds which come primarily from a south-westerly direction. See Tetra-Tech 1987, Figure 11, Johnsons Curve and Highway Junction sites.

No discussion of directional variography or the search for spatial anisotrophy is found in this study. In particular, in the regional soils, the data selected to fall within the study boundaries artificially truncates the potential variograms range. Furthermore, it is most likely that a review of directional variograms will show distinct anisotrophies controlled by airflow in the valleys.

A correct modeling of the directional anistrophy will most likely have the greatest effect on the Regional kriging results.

! Histograms of the cross-validation work should be included to give a visual QA/QC of the effectiveness proposed of variogram model. The effects of varying the range, nugget, sill, and anistrophy of the interpreted variogram model can be explored.

! The arsenic data is shown be sufficiently log-normal to warrant transformation to normalize the data. The concern stated on page 3-4, Vol. II is not valid:

> "Kriging can be performed on log-transformed data sets; however, when the kriged results are back-transformed, the biases that are introduced make it impossible to accurately calculate confidence intervals"

The compensation for back-transformation biases are well understood theoretically. However the general relative transformation can be used as a surrogate for log-transformation.

! Appendix D...The variography for Arsenic is misfiled under Appendix E, X-Value Kriged Estimation.

! It is unclear on page 3-4, Volume II, on how the use of general kriging contributes to a "small sacrifice in the reliability of the estimates". This is after the text explains that "The general relative semivariograms resulted in much improved...confidence intervals around the estimates, as compared to the absolute semivarigrams.."

! For the Regional Soils it is probably an incorrect assumption (page 2-7, Volume I) that the density of subsurface data is insufficient for kriging.

! On page 3-5, Volume II, has a typographical error with "xx" used in place of numbers...

> "Within residential areas, estimated arsenic concentrations range from xx to 316 mg/kg"

<IMG SRC 0896127AM>
<IMG SRC 0896127AN>

December 1, 1995

Mr. Charles Coleman
Anaconda Project Manager
U.S. Environmental Protection Agency
Region VIII Montana Office
Federal Building
301 South Park, Drawer 10096
Helena, Montana 59626-0096

Subject: ARCO's Comments on the November 7, 1995 Review Draft of the Baseline Human Health Risk Assessment for the Anaconda NPL Site

Dear Charlie:

ARCO's comments on the baseline human health risk assessment for Anaconda are provided in this letter. We do not at this time have any comments that would require revisions in the risk calculations. We do have some comments about supporting next and risk characterization:

- Arsenic toxicity - we believe that references to the recent paper by Mushak and Crocetti undermines the discussion of uncertainty in the toxicity criteria for arsenic (Section 5.3.4) due to the extensive technical errors, omissions and misinterpretations of the literature in their analysis. We request that reference to this paper be removed from the risk assessment, and that this reference be replaced with more technically valid citations.

- Lead exposures - EPA used version 0.99 of the IEUBK model to characterize risks associated with exposure to lead in soil and dust in Anaconda. EPA's analysis indicated a slight exceedance in one subarea of EPA's desired level of protection, i.e., that less than 5 percent of children will have blood lead levels greater than 10 mg/dL. ARCO has strong reservations about the validity of this model, especially in the absence of extensive site-specific data against which the model can be calibrated. At this site, we agree that EPA's assertion that there is not currently sufficient data available to support a site-specific estimate of soil lead' bioavailability; however, we do believe available site-specific soil ingestion data are sufficient to support a site-specific modification of soil ingestion rates. By comparing site-specific soil ingestion data with the default values in the IUEBK model we have concluded that soil lead exposures in Anaconda are not expected to exceed EPA's desired level of protection because of the default values are much greater than values derived from site-specific data. In the IEUBK model, soil

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agricultural lands as well. We also need to reach agreement on appropriate exposure units for application of these target risks, i.e., areas over which individuals are likely to be exposed. We believe that exposure units for residential area lifetime cancer risks should be substantially larger than a single residential yard because an individual will derive only a fraction of their exposure over a 30 year period from single yard. Even if they remain in Anaconda, most people will not reside in the same house from birth until they are 30 years old. Even the rare individual who stays in one house will have exposures from around the neighborhood. Thus, we request that EPA use residential exposure units of a residential block or larger. This approach is especially appropriate in Anaconda, where most of the arsenic soil is derived from a single large source transported by atmospheric dispersion. Using the same logic, exposure units for the agricultural lands should be at least as large as a typical ranch. We recommend that the one mile square areas evaluated in the remedial investigation be used as exposure units. This size (640 acres) is likely to provide a conservative estimate of a typical ranch size.

Once again we would like to thank EPA for their willingness to review and critique site-specific data we have developed and submitted during the course of this investigation. We believe that the investigations conducted in Anaconda have furthered our understanding of arsenic exposures in smelter communities, and will provide EPA with useful information for application to many other sites. Please call me if you wish to discuss our comments.

<IMG SRC 0896127AP>

cc: Andy Lensink, EPA/Denver
Susan Griffin, EPA/Denver
Andy Young, MDEQ
Robin Bollock, ARCO/Anaconda
Howard Greene, ARCO/LA
Pam Sbar, ARCO/Denver
Rosalind Schoof, PTI/Bellvue

<IMG SRC 0896127AQ>

February 29, 1996

ADMINISTRATIVE RECORD

Mr. Charles Coleman
Anaconda Project Manager
U.S. Environmental Protection Agency
Region VIII Montana Office
Federal Building
301 South Park, Drawer 10096
Helena, Montana 59626-0096

Subject: Arsenic Clean Up for Residential Areas in Anaconda

Dear Charlie:

The purpose of this letter is to provide EPA with a risk-based derivation of a cleanup level that would be appropriate to apply to individual yards in Anaconda. In our December 1, 1995 comments on the Anaconda baseline risk assessment, we recommended that residential cleanup decisions in Anaconda be made on the basis of average arsenic concentrations in a neighborhood or over a residential block. The basis for this recommendation is the fact that people spend a substantial portion of their time away from home, and are also not likely to reside in the same house ass a child and as an adult. Thus the exposures received during the 30 years of exposure assumed by EPA are likely to represent an average of exposures received at more than one residence, and from other areas of the community.

If it is necessary for EPA to establish a cleanup level that could be applied to an individual yard, the yard cleanup level should reflect the time spent elsewhere in the community. We propose that this be done by estimating the proportion of time spent away from home, and assuming that the average arsenic concentration to which a person is exposed while away from home is the same as the average arsenic concentration for all residential areas, i.e., 172 ppm according to the draft final baseline risk assessment. If we assume that the target risk for an individual home should not exceed 1 x 10-4, the 297 ppm community trigger level can then be used to back calculated the cleanup level for an individual home.

The proportion of exposures likely to occur away from home can be estimated from activity pattern data reviewed in EPA's June 1995 revision of the Exposure Factors Handbook. Three large studies of time and activity patterns are analyzed in the handbook, a national survey of adults conducted in 1985, a study of adults conducted in California during 1987 and 1988, and a study of children conducted in California during 1989 and 1990. Although the fraction of time awake that is spent away from home is not directly reported in these studies, it can be calculated as follows. These studies report the total amount of time spent at home each day, including the time spent sleeping, and the time spent away from home. For adults, the time spent sleeping (at home) is also reported. Thus, the time awake at home can be calculated by subtracting the time spent sleeping from the total time at home. The total time awake can then be calculated by adding the time away from home to the awake time at home. These calculations are shown in Table 1. Data from both the national and

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California studies are included. Additionally, because women spend more time home than men do, data for women are also provided. As shown in Table 1, the average percent of time awake that is spent away from home ranges from 44 to 58 for adults.

Sleep times were not reported for children, so we assumed that children between the ages of 0 and 11 years spent an average of 10 hours, or 600 minutes, sleeping. This estimate is likely to be conservative based on the time reported in the personal care activity category. This category includes sleep, and the times reported for children (794 minutes per day) are approximately 150 minutes higher than those reported for adults (642 minutes per day in both surveys). Adults reported that they sleep approximately 500 minutes per day, so children may sleep as much as 650 minutes per day. When it was assumed that children sleep 600 minutes per day, it was estimated that they are away from home 43 percent of the time they are awake.

After reviewing the activity data for adults and children we concluded that it is reasonably conservative to assume that during a 30 year exposure duration, while awake an Anaconda resident will spend 45 percent of their time away from home and 55 percent of their time at home. This assumption is conservative because it assumes that 30 years will be spent living in the same house. These values may then be used in the following equation to calculate a risk-based cleanup level for an individual yard:

Risk-based target concentration = (0.45)(Community concentration) + (0.55)(Yard concentration).

When the risk-based trigger concentration is 297 ppm and the average community concentration is 172 ppm, the average yard concentration would be 399 ppm. Thus, a cleanup level of 400 ppm for an individual yard would guarantee that a reasonable maximum exposure (RME) would not exceed a target risk of 1 x 10-4. As indicated by EPA's central tendency estimate (which yields a 1x10-4 risk screening level of 1,852 ppm), actual risks are likely to be only a fraction of the RME estimates. It is also noteworthy that EPA's RME screening level of 297 ppm does not account for the fact that in Anaconda exposures to soil will be minimal during the 155 days per year when the ground is frozen or snow covered. If wintertime soil and dust ingestion exposures are assumed to be limited to indoor dust, the RME screening level would increase from 297 to approximately 330 ppm. For these reasons, we believe that the cleanup level for an individual yard should be set at 400 ppm. We would be pleased to discuss this recommendation with you further at your convenience.

<IMG SRC 0896127AS>

cc: S.M. Stash
P.S. Sbar
R.W. Lawrence
H. Greene
C. Lapin
P. Flack
K. Ekstrom/AGC

File: 72.05.110.1

TABLE 1. DERIVATION OF ESTIMATES FOR THE PERCENT OF TIME AWAKE SPENT AWAY FROM HOME

	Adults (ages 18-64)				Children (ages 0-11)			
	National (1985)		CARB (1987-88)		CARB (1989-90)			
	Total Sample (N=1,980)	Women (n=1,059)	Total Sample (N=1,359)	Women (n=720)	Sample (N=1,200			
Time duration(minutes per day)								
At home	954a	1,022a	892a	963a	1,078b			
At home, asleep	(-)494c		496c		498c	504c	600d	
At home, awake*	460	526	394	459	478			
Away from home (including travel)	(+)478a		411a		546a	473a	362b	
Total awake time*	938	937	940	932	840			
Percent of time awake spent away from home*	51	44	58	51	43			

aData from U.S. EPA 1995, Table 5-26
bData from U.S. EPA 1995, Table 5-34
cData from U.S. EPA 1995, Table 5-28
dBest professional estimate
*Calculated value

<IMG SRC 0896127AT>

August 9, 1996

VIA FEDERAL EXPRESS
Mr. Charles Coleman
USEPA, Montan Office
301 South Park, Drawer 10096
Helena, MT 59626

VIA FEDERAL EXPRESS
Mr. Andrew J. Young
MDEQ, Superfund Section
2209 Phoenix Avenue
Helena, MT 59601

Re: Comments of Atlantic Richfield Company on the Anaconda Smelter Superfund Site, Community Soils Operable Unit, Proposed Plan

Dear Mr. Coleman and Mr. Young:

Atlantic Richfield Company ("ARCO") submits the following comments on the July 1996 Community Soils Operable Unit Proposed Plan ("the Proposed Plan"). ARCO applauds the agencie's efforts to involve the community in the process through the Community Protection Measures Program ("the CPMP") and to identify Preferred Alternatives that recognize current and reasonably anticipated future land use and institutional controls through the Anaconda-Deer Lodge Master Plan, the Development Permit System, and the CPMP. ARCO expects to continue to work with the County to ensure reliable, effective and enforceable institutional controls (Ics) for the Community Soils Operable Unit ("CSOU"), including appropriate funding arrangements for implementation of such controls within the Focus Areas identified in the Proposed Plan. ARCO will provide the agencies with ARCO's letter to the County with respect to implementation and funding of the CPMP early next week for inclusion in the administrative record of the CSOU.

Based upon ARCO's work on the CSOU RI/FS, Alternative No. 3, In-Place Treatment, Capping and ICs, meets the requirements of CERCLA and the NCP, and is preferable over Preferred Alternative No. 4 identified in the Proposed Plan. Alternative No. 3: 1) is fully protective of human health and the environment; 2) attains ARARs; 3) provides at least equivalent long-term effectiveness and permanence as Alternative No. 4; 4) reduces the toxicity, mobility or volume of contaminated soils through treatment that immobilizes arsenic and other metals present in the soils; 5) provides greater short term protection to the community and workers during implementation than Alternative No. 4, without soil excavation, transport and replacement risks associated with Alternative 4; 6) is at least as implementable as Alternative No. 4; and 7) costs less than Alternative No. 4. Alternative No. 3 is the most cost effective remedy for the CSOU. Alternative No. 3 satisfies CERCLA's preference for treatment. The Proposed Plan itself recognizes most of these advantages of Alternative No. 3. Yet, EPA identifies Alternative No. 4 as the Preferred Alternative on the basis that "the removal option is a

more proven, protective and permanent remedy that is readily implementable and cost effective." The Proposed Plan provides no basis for EPA's conclusion, and the administrative record does not support this conclusion. Alternative No. 3 is less invasive, less costly, takes less time, is more readily implementable, is less disruptive, and is protective of public health and the environment. It is the most sensible alternative for the CSOU. ARCO requests that the Agency reevaluate its position and select Alternative NO. 3 as the remedy in the ROD.

ARCO also contests the 250 ppm residential soils action level for arsenic identified in the Proposed Plan. ARCO incorporates by reference its February 29, 1996 letter to Mr. Charles Coleman regarding arsenic cleanup levels for residential areas in Anaconda, and its December 1, 1995 comments on the Anaconda human health baseline risk assessment. ARCO has provided EPA with justification for using a significantly higher residential soil arsenic action level for the CSOU based upon current, generally accepted methods and assumptions for evaluating risk. ARCO requests that EPA raise the residential soils action level for arsenic for the CSOU to at least 297 ppm arsenic. This level itself is highly conservative and would provide more than adequate protection of human health.

ARCO requests that any alternative selected for the CSOU recognize the property rights of landowners. To that end, the ROD should expressly state that remedial action at the CSOU will be undertaken upon a private landowner's property only at the request of the landowner. Additionally, the ROD should specify that remediation will only occur in residential areas within the Focus Areas that are not already adequately covered with lawn, vegetation or another appropriate protective barrier. The selected remedy should not require removal of lawns, vegetated areas, or other barriers that currently provide adequate protection of public health.

Additional comments on the Proposed Plan are set forth in ARCO's August 9, 1996 CSOU RI/FS Disclaimer Letter, attached hereto as Exhibit A and incorporated herein by reference.

ARCO's specific comments on the Proposed Plan are set forth below.

1. EPA Should Utilize ARCO's ARARs Clarification Document or a subset Thereof as the Final ARARs for the Community Soils Remedy Selected in the ROD. ARCO submitted to EPA and MDEQ ARCO's Clarification of Applicable or Relevant and Appropriate Requirements for the Community Soils Operable Unit (the "ARARs Clarification Document"). The ARARs Clarification Document is attached hereto as Exhibit B and is incorporated herein by reference. The ARARs identified in ARCO's Clarification Document are based upon EPA's and the State's initial identification of ARARs, but are more specifically tailored to, and are more appropriate for, the site-specific circumstances and remedial alternatives identified for the Community Soils Operable Unit in the Proposed Plan. The Community Soils remedy should

pertain only to remediation of certain current and reasonably anticipated future residential soils within identified Focus Areas and railbeds within Anaconda. The residential soils action levels and the actions required for remediation of residential soils and railbeds are spelled out in the Preferred Alternatives. Remediation of surface water, groundwater, and media other than residential soils and railbeds is outside the scope of this Operable Unit and ARARs should not be identified for these media. EPA has determined that air quality is not currently adversely affected by contaminated soils present at the Community Soils Operable Unit. See Proposed Plan, p.3. Thus, remediation of air quality should not be an objective of this Operable Unit.

Moreover, there is no need for EPA to identify all possible federal and state requirements as final ARARs in the ROD in order to ensure a protective remedy. For example, the Proposed Plan identifies action levels for residential soils cleanup, the maximum depth of excavation, the potential areas of excavation, fill requirements and protective barrier requirements. Flexibility exists for circumstances when excavation may not be appropriate, determining the appropriate depth of excavation, and selecting the type of protective barrier that is most appropriate. These requirements for the remedy should guide remedial design/remedial action decisions, not preliminarily identified ARARs that may only be tangentially related to, and may in fact impede selection and implementation of, a remedy that is protective of public health and the environment.

The Proposed Plan recognizes that the Alternatives No. 3 and No. 4 will attain ARARs. Only those requirements that meet the requirements of section 121(d) of CERCLA and the NCP and specifically pertain to the Community Soils Operable Unit final remedy are identified as ARARs in ARCO's ARARs Clarification Document. The ARARs Clarification Document is conservative and overinclusive of potential ARARs. It may be appropriate to identify a subset of ARARs identified in the Clarification Document as final ARARs in the ROD.1 EPA should attach ARCO's ARARs Clarification Document, or a subset thereof, as the final ARARs for the ROD. ARCO looks forward to working closely with EPA and MDEQ to develop appropriate and Final ARARs and performance standards.

1ARCO notes that its ARARs Clarification Document is, if anything, overinclusive of potential ARARs for the Community Soils Operable Unit. The Alternatives No. 3 and No. 4 identified in the Proposed Plan could be implemented readily in a manner protective of public health and the environment and consistent with CERCLA and the NCP with far fewer ARARs. For example, most requirements identified as relevant and appropriate in ARCO's ARARs Clarification would more appropriately be addressed upon professional judgement in remedial design consistent with the remedy described in the ROD. Inclusion of a specific requirement in ARCO's ARARs Clarification Document does not mean that ARCO endorses the requirement as an ARAR.

2. ARCO Incorporates by reference its Disclaimer Letter on the RI/FS. EPA required ARCO to incorporate certain comments and revisions in the Final Draft Community Soils RI/FS (June 1996), which was prepared by ARCO and approved by EPA. ARCO provided EPA with a disclaimer letter with respect to revisions with which ARCO disagrees on August 9, 1996. ARCO incorporates by reference the comments in its August 9, 1996 Disclaimer Letter.

3. Cleanup Actions for Current and Reasonably Anticipated Future Residential Soils Must be Limited to specified Residential Areas that are Within the Focus Area in Figures 2 and 3 of the Proposed Plan. EPA has identified "Focus Areas" for Anaconda Residential Soils and Regional Residential Soils for the Community Soils Operable Unit. The Focus Areas are based] on soils characterization in the RI/FS Report and EPA's overly conservative statistical determination of where there is a potential for risk. Response actions at the Community Soils Operable Unit should be limited to the Focus Areas, and the railbeds within the community of Anaconda.

Areas outside of the Focus Areas are by definition not areas of concern to human health based upon EPA's overly conservative statistical methodology. ARCO strongly objects to the proposed inclusion of "opportunistic sampling and remediation of potentially contaminated soils outside the Focus Area: as an element of the Preferred Alternative for residential soils or of the remedy selected in the ROD. See, Proposed Plan, p.7. Areas outside of the Focus Areas should be no longer be considered within this Operable Unit and should be deleted (in accordance with appropriate procedures) from the Anaconda Smelter NPL site. Sampling or other activities outside of the Focus Areas should not be addressed under CERCLA and should not be covered under the CPMP.

4. Funding Procedures for Cleanup of Future Residential areas Should be in Accordance with Procedures Specified in the CPMP and the DPS and Should not be Specified in the ROD. The description of the Preferred Alternative for Residential Soils states "Funding for implementation of the DPS, including cleanup efforts directly related to contaminated soils, will not be required of individuals or the county." Proposed Plan, P.7. The Proposed Plan also provides, "Funding for implementation of the CPMP will not be required of the County." Id.

As EPA is aware, ARCO is working cooperatively with the County to establish appropriate funding mechanisms for the CPMP and the DPS. The CPMP will specify appropriate and fair funding mechanisms for cleanup efforts and education directly related to contaminated soils at current and reasonably anticipated future residential areas within the Focus Areas. ARCO recognizes that institutional controls are a key component of the remedy for the community Soils Operable unit, and expects to work closely with the County to ensure appropriate and mutually acceptable funding mechanisms are in place. However, it is inappropriate, unnecessary and inconsistent with CERCLA and the NCP for the Proposed Plan or

the ROD to include some, while excluding other, potential funding sources. ARCO does not anticipate that new subdivisions or resubdivisions, new activities on previously reclaimed areas such as Teresa Ann Terrace, or individuals or entities who convey property for residential development in the focus areas after the issuance of the Community Soils ROD will be funded under the funding mechanism agreed upon between ARCO and ADL. As discussed above, ARCO also does not anticipate that the CPMP or any cleanup/sampling actions will be funded outside of the Focus Areas.

ARCO anticipates that ARCO and ADL will arrive at a mutually acceptable funding mechanism for the CPMP and for the DPS prior to issuance of the ROD. ARCO will keep EPA and MDEQ apprised of the status of the funding arrangement with ADL.

5. No Preference Should Be Given To Removal of Soils at Future Residential Areas. The Proposed Plan states on page 7 that preference will be given to removal at future residential areas where appropriate. It is not necessary to establish a preference for removal. Rather, the most appropriate cleanup mechanism consistent with the ROD, CPMP and DPS should be used. The Proposed Plan recognizes that the most appropriate measure should be taken. To clarify this, ARCO requests that EPA delete the preference for removal of soils at future residential areas in the ROD.

6. ARCO Concurs with EPA that Risks to Human Health within the community Soils Operable Unit Are Below Levels of Concern. ARCO submitted comments on EPA's Anaconda Baseline Human health Risk Assessment to the agencies on December 1, 1995. ARCO'S comments are incorporated herein by reference. ARCO agrees that health risks to resident in Anaconda and Opportunity, as well as predicted blood levels, are below EPA's levels of concern.

7. The "Designated Soil Management Area" Should Be Identified in the Rod as the ADL Designated Soils Repository. The Opportunity Ponds area is identified as the ADL Designated Soils Repository.

8. ARCO Generally Supports the Preferred Alternative for Railroad Beds. The Preferred Alternative should be implemented in a cost-effective manner consistent with Rarus' active operation and maintenance of the rail line. The selected remedy should be limited to the portion of the Rarus railbed within the current boundaries of the community of Anaconda. Given the low risk, the remedy should be implemented at the time of scheduled ongoing maintenance over an appropriate period of time. ARCO expects to work closely with RARUS to propose a mutually acceptable approach for the railbeds to EPA and MDEQ.

By submitting these comments, ARCO does not admit and reserves its right to contest any liability or conclusions of fact or law related to the Community Soils Operable Unit. Without Limitation, ARCO does not admit and reserves its right to contest the Statement in the Proposed Plan that "railroad beds [were] constructed primarily by a subsidiary of the Anaconda Copper Mining company, both in Anaconda and regionally." The Agency has provided no basis for this allegation. Such allegations are inappropriate in the Proposed Plan and the ROD. Additionally, the Proposed Plan speculates that railroad beds were likely constructed of materials from the Anaconda or Butte mining/smelting operations, again without basis. This unsubstantiated assertion is also inappropriate and unnecessary for the Proposed Plan or the ROD.

ARCO appreciates the opportunity to submit these comments. ARCO requests that the agencies give these comments full and careful consideration. Please respond to each of these comments in the Responsiveness summary of the ROD. Also, please include these comments in the administrative record for the community Soils Operable Unit. ARCO requests that the Agency select the remedy in the CSOU ROD in accordance with these comments. If you have any questions, please call me at (406) 563-5211 ext. 414.

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Enclosures

cc w/enc: Andrew J. Lensink, Esq.
Sandra M. Stash, P.E.
Pamela S Sbar, Esq.
Mary Capdevill, Esq.

CLARIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, STANDARDS, CONTROLS CRITERIA, OR LIMITATIONS FOR THE ANACONDA SMELTER SUPERFUND SITE, COMMUNITY SOILS OPERABLE UNIT REMEDIAL ACTION

INTRODUCTION

Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), the National oil and Hazardous substances Pollution Contingency Plan (the "NCP), 40 CFR Part 300 91990), and guidance and policy issued by the Environmental Protection Agency ("EPA") require that remedial actions under CERCLA comply with substantive provisions of applicable or relevant and appropriate standards, requirements, criteria, or limitations from state of Montana and federal environmental laws and State facility siting laws during and at the completion of the remedial action. These requirements are threshold standards that any selected remedy must meet.

This Clarification is provided as an Appendix to the community Soils FS. This Clarification identifies final ARARs that are expected to apply to the activities to be conducted under the community Soils Operable unit ("CS OU") remedial action. The following ARARs or groups of related ARARs are each identified by a statutory or regulatory citation, followed by a brief explanation of the ARAR and how and to what extent the ARAR is expected to apply to the activities to be conducted under this remedial action.

Final remediation of groundwater and surface water within the CS OU is not within the scope of the remedial action for this Operable Unit. Further, it is anticipated that remediation soils will not result in significant degradation of groundwater or surface water. Water quality] provisions for groundwater and surface water set forth herein are not identified as final ARARs or performance standards for the CS OU. The requirements are identified only for purposes of]preventing significant degradation of groundwater or surface water when conducting a remedial action, and to ensure that the remedial action at the CS OU is consistent, to the extent practicable, with the groundwater and surface water ARARs for the Regional water, Waste, and Soils (:RWW&S") OU, which will be the final response action for these media.

Substantive provisions of the requirements listed below are identified as ARARs pursuant to 40 CFR § 300.400. ARARs that are within the scope of this remedial action must be attained action for the CS OU in accordance with Section 121(e) of CERCLA.

TYPES OF ARARs

ARARs are contaminant, location, or action specific. Contaminant specific requirements address chemical or physical characteristics of compounds or substances on sites. These values establish acceptable amounts or concentrations of chemicals which may be found in or discharged to the ambient environment.

Location specific requirements are restrictions placed upon the concentrations of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs relate to the geographical or physical positions of sites, rather than to the nature of contaminants at sites.

Action specific requirements are usually technology based or activity based requirements or limitations on actions taken with respect to hazardous substances, pollutants or contaminants. A given cleanup activity will trigger an action specific requirement. Such requirements do not themselves determine the cleanup alternative, but define how chosen cleanup methods should be performed.

Many requirements listed as ARARs are promulgated as identical or near identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by EPA and the state. The Preamble to the NCP provides that such a situation results in citation to the state provision and treatment of the provision as a federal requirement.

I. CONTAMINANT SPECIFIC ARARs

A. Federal and State Groundwater and Surface Water ARARs

final remediation of groundwater and surface water is not within the scope of the CS OU and will be addressed, as appropriate, under the RWW&S OU. EPA identifies certain groundwater and surface water requirements herein solely for the purposes of 1) prohibiting significant degradation of these media by this remedial action, particularly with respect to the railroad beds, and 2) achieving consistency with the R22&S OU response action. Specifically, these requirements are intended solely to aid in the identification of potential contamination from the soils and railroad beds to groundwater and surface water and for developing remedial alternatives. The groundwater and surface water requirements identified herein are not performance standards or final ARARs for the CS OU. These requirements are listed below.

1. Surface Water, M.C.A. §§ 75-5-303, -308, -708 AND -317; ARM § 16.20.711. These sections establish nondegradation requirements for surface waters. Section 708 provides that existing and anticipated uses and the water quality necessary to protect those uses must be maintained unless degradation is allowed under the nondegradation rules of ARM § 16.20.711. MCA § 708 provides for short term exemptions from surface water nondegradation requirements and § 317 identifies activities that are considered "not significant" and thus not subject to nondegradation requirements.

2. Groundwater.

a. ARM § 16.20.1002 AND .1003 (applicable). Groundwater in the CS OU is classified as Class I.

b. ARM § 16.20.1011 (applicable). This section provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless the board is satisfied that a change is justifiable for economic or social development and will not preclude present or anticipated use of such waters.

c. M.C.A. § 75-5-317 (applicable). This section identifies sources of pollution that are considered non-significant activities, and not subject to nondegradation requirements.

B. Federal and State Air Quality Requirements.

1. National Ambient Air Quality standards, 40 CFR § 50.6 (PM-10); 40 CFR § 50.12 (lead) (applicable). These provisions establish standards for PM-10 and lead emissions to air. Corresponding state standards are found at ARM § 16.8.815 (lead) and ARM § 16.8.821 (PM-10).

2. Montana Ambient Air Quality Regulations, ARM §§ 16.8.807, .815, .818, and .821 (applicable).

a. Arm § 16.8.807. This provision establishes sampling, data collection and analytical requirements to ensure compliance with ambient air quality standards.

b. ARM § 16.8.809. Establishes sampling, data collection, recording, and analysis to ensure compliance with ambient air quality standards.

c. ARM § 16.8.815. Lead emissions to ambient air shall not exceed a ninety (90) day average of 1.5 micrograms per cubic liter of air.

d. ARM § 16.8.818. Settled particulate matter shall not exceed a thirty (30) day average of 10 grams per square meter.

e. ARM § 16.8.821. PM-10 concentrations in ambient air shall not exceed a 24 hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

II. LOCATION SPECIFIC REQUIREMENTS

The statutes and regulations set forth below relate to the preservation of certain cultural, historic, natural or other national resources which may be adversely affected by the CS OU remedial action. They require that such resources be identified, and that steps be taken

to minimize the impact of the remedial action upon any such resources.

A. National Historic Preservation Act. 16 U.S.C. § 470, 40 CFR § 6.301 (b), 36 CFR Part 800 ("NHPA'") (applicable). This statute requires Federal agencies to take into account the effect of this response action upon any district, site, building, structure, or object that is included in or eligible for the register of Historic Places. compliance with NHPA requirements has been attained through the Regional Historic Preservation Plan as implemented pursuant to agreements with EPA, Anaconda/Deer Lodge, the Advisory council and other parties.

B. Historic Sites, Building and Antiquities Act, 16 U.S.C. § 461 et seq.; 40 CFR § 6.310(a) (applicable). This provision requires federal agencies to consider the existence and location of land marks on the National registry of National Landmarks and to avoid undesirable impacts on such landmarks. It is not anticipated that the remedial action will affect or result in adverse impacts to National Landmarks.

C. Endangered Species Act, 16 U.S.C. § 1521, 40 CFR § 6.302(h), 50 CFR Parts 17 and 402 (applicable). This statute and implementing regulations provide that federal activities not jeopardize the continued existence of any threatened or endangered species. Based upon available information and investigations to date, and consultation with the U.S. Fish and Wildlife Service, no designated threatened or endangered species or their habitat are expected to be affected by this remedial action.

D. Floodplain Management, 40 CFR § 6.302(b), and Executive Order No. 11988. These require that actions be taken to avoid, to the extent possible, adverse effects associated with direct or indirect development of a floodplain, or to minimize adverse impacts if no practicable alternative exists.

III. ACTION SPECIFIC REQUIREMENTS

A. Federal and State RCRA Subtitle D Requirements (relevant and appropriate).

40 CFR Part 257 establishes criteria under Subtitle D of the Resource Conservation and Recovery Act for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health or the environment. See 40 CFR § 257.1(a). this part comes into play whenever there is a "disposal" of any solid or hazardous waste from a "facility." "Disposal" is defined as "the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters." See 40 CFR § 257.2. "Facility" means "any land and appurtenances thereto used for the disposal of solid wastes." It is not anticipated that disposal of solid waste will occur through implementation of the remedial action for the CS OU. These requirements do not pertain to the consolidation of materials in a waste management area or to the treatment/capping of materials in place.

B. Montana Strip and Underground Mine Reclamation Act, M.C.A. § 82-4-201 and following (relevant and appropriate).

Certain discrete portions of the following regulatory provisions, to the extent they address grading requirements, erosions control, and stabilization measures that will be useful in securing certain locations addressed by the remedial action at the CS OUT, are identified as relevant and appropriate requirements. If a portion of a regulation is not specifically referred to below, then that portion of the regulation is considered to be an ARAR or performance standards.

1. ARM § 26.4.501(3)(a) and (d) and (4). Backfill must be placed so as to minimize sedimentation, erosion, and leaching of acid or toxic materials into waters, unless otherwise approved.

2. ARM § 26.4.502(A)(1)(a) and (2). Final graded slopes will be 5:1 unless otherwise approved. If steeper, slopes must have a long term status safety factor of 1:3, not to exceed the angle of repose unless the existing grade of the area is steeper, in which case the existing grade meets this requirement. Disturbed areas must be blended with undisturbed

ground to provide a smooth transition in topography. This requirement does not pertain to residential yards or commercial property or similar landscaped areas.

3. ARM § 26.4.514. Final grading will be done along the existing contour in order to minimize subsequent erosion and instability, unless otherwise approved. This requirement does not pertain to residential yards or commercial property or similar landscaped areas.

4. ARM § 26.4.519. Pertinent areas of the CS OUT where excavation will occur will be regraded to minimize settlement.

5. ARM § 26.4.631(1), (2), (3)(a) and (b). Disturbances to the prevailing hydrologic balance will be minimized. Changes in water quality and quantity, in the depth to groundwater and in the location of surface water drainage channels will be minimized, to the extent practicable and consistent with the selected remedial alternatives.

6. ARM § 26.4.638(1)(a) and (c) and (2). Practices to prevent or minimize sedimentation and erosion will be employed to the extent possible.

7. ARM § 26.4.638(2). Sediment control measures must be implemented during operations.

8. ARM § 26.4.702(4), (5) and (6). Practices to prevent compaction, slippage, erosion, and deterioration of biological properties of soil will be employed.

9. ARM § 26.4.711. Requires that a diverse, effective and permanent vegetative cover of the same seasonal variety and utility as the vegetation native to the area of land to be affected must be established. This provision would not be relevant and appropriate in certain instances, for example, where there is dedicated development, or in areas of residential or commercial development.

10. ARM § 26.4.761(2)(a), (e), (h), (j), and (k). These provisions specify fugitive dust control measures which will be employed during excavation and construction activities to minimize the emission of fugitive dust in the CS OU. These provisions are addressed below in Section III.C.

C. Air Requirements (all applicable).

1. ARM § 16.8.1401(2), (3), and (4). Airborne particulate matter. There shall be no production, handling, transportation, or storage of any material, use of any street, road, or parking lot, or operation of a construction site or demolition project unless reasonable precautions are taken to control emissions of airborne particles. Emissions shall not exhibit an opacity exceeding 20% or greater averaged over 6 consecutive minutes.

2. ARM § 16.8.1404(2). Visible Air Contaminants. Emissions into the outdoor atmosphere shall not exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

3. ARM § 16.8.1427. Nuisance or odor bearing gases. Gases, vapors and dusts will be controlled such that no public nuisance is caused within the CS OU.

4. ARM § 16.8.4761(2)(a), (e), (h), (j) and (k). Fugitive dust control measures such as 1) watering, stabilization, or paving of roads, 2) vehicle speed restrictions, 3) stabilization of surface areas adjoining roads, 4) restriction of travel on other than authorized roads, 5) enclosing, covering, watering, or otherwise treating loaded haul truck, 6) minimizing area of disturbed land, and 7) revegetation, must be planned and implemented, if any such measure or measures are appropriate for this remedial action.

D. Air Quality Requirements (applicable).

Remedial activities will comply with the following requirements to ensure that existing air quality will not be aversely affected by the CS OU remedial action.

1. ARM § 16.8.815. The concentration of lead in ambient air shall not exceed a 90 day average of 1.5 micrograms per cubic meter of air.

2. ARM § 16.8.818. Settled particulate matter shall not exceed a 30 day average of 10 grams per square meter.

3. ARM § 16.8.821. The concentration of PM-10 in ambient air shall not exceed a 24 hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

<IMG SRC 0896127AV>

August 9, 1996

Mr. Charles Coleman
U.S. Environmental Protection Agency
Region VIII; Montana Office
Federal Building
301 S. Park, Drawer 10096
Helena, MT 59626-0096

VIA FEDERAL EXPRESS

Mr. Andrew Young
Environmental Remediation Division,
Montana Department of Environmental Quality
2209 Phoenix Avenue
Helena, MT 59620

VIA FEDERAL EXPRESS

Re: Atlantic Richfield Company Disclaimer of Required Revisions in the June 1996 Final Draft Community Soils Remedial Investigation/Feasibility Study (the "CSOU RI/FS")

Dear Mr. Coleman and Mr. Young:

ARCO hereby disclaims any revisions ARCO made to the CSOU RI/FS in response to comments received from EPA or the State on prior drafts of the RI/FS or other CSOU deliverables. The deliverables ARCO initially submitted to the agencies with respect to the CSOU pursuant to Administrative Order on Consent, Docket No. CERCLA VIII-88-16, as amended, (the "AOC") were prepared in accordance with the requirements of the AOC and the Community Soils RI/FS Work Plan. ARCO has the following specific comments:

1. EPA did not prepare a complete rewrite of the RI/FS, and no complete rewrite was required. Contrary to assertions in EPA's July 30, 1996 letter to Sandy Stash, EPA did not prepare a "complete rewrite" of the Community Soils RI/FS. ARCO's initial draft CSOU RI/FS submittals to EPA followed the framework of the RI/FS Statement of Work (which EPA prepared) and were prepared in accordance with the AOC. ARCO objects to EPA's contention that such submittals required complete rewrite. EPA elected to revise the framework for preparation of the RI/FS, and provided ARCO with an outline for the revisions. Certainly, EPA's outline cannot be characterized as a rewrite. In an case. ARCO cooperatively prepared subsequent RI/FS deliverables in accordance with EPA's outline. ARCO certainly did not expect that its cooperation would be construed as evidence of :limited focused attention to the final RI/FS activities in Anaconda" as EPA claimed in its July 30, 1996 letter.

2. Kriging methods EPA required were unnecessary and overly conservative. EPA required that ARCO undertake a second and third round of kriging to show the kriged

distribution for arsenic in Anaconda. ARCO's first round of kriging was in accordance with generally accepted methodologies and provided a conservative basis for determining residential areas in the CSOU requiring remediation. The second round of kriging that EPA required was based on a faulty software package we understand was suggested by the United States Department of Justice.1 ARCO was then required to undertake a third round of "relative" kriging. The second and third rounds of kriging were not necessary to determine the kriged distribution of arsenic in Anaconda and resulted in a highly over-conservative estimate of the number of residential blocks exceeding the arsenic action level. EPA compounded the problems with this approach when it required ARCO to use the upper 90% confidence interval instead of the "best estimate" and then identified an action level of 250 ppm soil arsenic.

ARCO contests the use of relative kriging EPA required in the third round, the required use of the faulty DOJ software package in the 2nd round, the use of the upper 90% confidence level, and the use of 250 ppm arsenic action level for residential soils kriging. This approach does not comport with generally accepted methodolgoies and is inconsistent with and more conservative than risk-based cleanup levels specified in the NCP. The number of residential blocks exceeding 297 ppm arsenic in residential surface soils for Anaconda based upon ARCO's "best estimate" approach in the first round of kriging was zero. In contrast, the number of residential blocks exceeding 297 ppm arsenic in surficial soils in the third round of kriging was 9[2]. Use of the 250 ppm arsenic level further increased the number of blocks. The ordinary kriging ARCO used in the first round based upon the best estimate approach is sufficiently conservative and provides a more accurate number of residential blocks exceeding the arsenic action levels. ARCO disclaims the results of the kriging required in the second and third rounds.

3. No technical or risk-based justification exists for determining 250 ppm arsenic as the residential soils action level. ARCO incorporates by reference its February 29, 1996 letter to Mr. Charles Coleman regarding arsenic cleanup levels for residential areas in Anaconda and its December 1,1995 comments on the Anaconda baseline risk assessment. ARCO provided EPA with justification for using a significantly higher action level based upon current, generally accepted methods for evaluating risk.

The 250 ppm arsenic action level for residential soils is not supported by current, generally accepted methods for evaluating risk to human health. Application of the 250 ppm

1If this understanding is incorrect, please inform us.

2This number does not include the three Teresa Ann Terrace blocks that were previously remediated or the two recreational and two commercial blocks that were classified inappropriately as residential by NRIS simply because they overlapped a residential street.

level to residential soils cleanup will result in unnecessary cleanups in areas that do not present an unacceptable risk to human health. ARCO disclaims the 250 ppm action level for arsenic in residential soils and any use made by the Agency of the action level.

4. EPA arbitrarily modified the ranking of alternatives in the final screening of alternatives. As ARCO ranked the alternatives in the final screening, Alternative 3, In-Place Treatment, capping and ICs, ranked ahead of Alternative 4, Excavation and Disposal. EPA acknowledges in the Proposed Plan that Alternative 3 is "fully protective of human health and the environment: and that alternative 3 attains ARARs. Alternative 3 is less invasive and is less costly that Alternative 4. EPA further acknowledges in the Proposed Plan that Alternative 4 "may be slightly more difficult to implement and have increased short-term impacts and costs over Alternative 3." No basis exists in the administrative record or the RI/FS for selecting Alternative 4 over Alternative 3. ARCO disclaims the ranking of the alternatives EPA required in the RI/FS, and requests that EPA review the record, revise the rankings, and identify Alternative 3 as the Preferred Alternative and remedy in the ROD.

5. Previously reclaimed areas and recreational areas should not be included in Focus Areas in the RI/FS. Inclusion of previously reclaimed areas and recreational or commercial areas in the Focus Areas is inconsistent with the objective of the Community Soils Operable Unit to address residential soils. ARCO disclaims inclusion of these areas within the Focus Areas.

This letter is not intended to provide specific "line by line" disclaimers to the CSOU RI/FS. The fact that ARCO has not addressed a specific revision EPA required in the CSOU RI/FS in it comments above should not be construed in any was as ARCO's agreement with such a revision. ARCO reserves its right to submit additional disclaimers and contest any revisions to the SCOU RI/FS required by the agencies.

We appreciate your consideration of these comments. Please include these comments in the CSOU administrative record. If you have any questions, please contact me at (406) 563-5211 ext. 414.

<IMG SRC 0896127AW>

cc: Andrew J. Lensink, Esq.
Sandra M. Stash, P.E.
Pamela S Sbar, Esq.
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